

Attachment #5

Sodium Hydroxide Solution, 50%

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer's name and address:
Olin Corporation – Chlor Alkali Products
Division

CLEVELAND, TN OFFICE
490 Stuart Road NE
Cleveland, TN 37312-4918
U.S. • (423) 336-4850

Supplier's name and address:
PCI Chemicals Canada Company d/b/a
Olin Chlor Alkali Products

MONTREAL, QC OFFICE
2020 University, Suite 2190
Montreal, Quebec H3A 2A5
Canada • (514) 397-6100

Product Name: Sodium Hydroxide Solution, 50%

CAS#: 1310-73-2

Preparation date (M/D/Y): 11/11/05

MSDS Code: NaOH(50)-E

Revision date (M/D/Y): 10/02/08

Synonyms: Caustic soda liquid 50%, Soda lye, Lye, Liquid Caustic, Sodium Hydrate

Product Use: Neutralizing agent, industrial cleaner, pulping and bleaching, soap manufacturing

Emergency Contacts (24 hr.)

FOR INFORMATION REGARDING ON SITE CHEMICAL EMERGENCIES INVOLVING A SPILL OR LEAK, CALL

Canada: 1-800-567-7455
U.S.: 1-800-424-9300 – CHEMTREC

SECTION 2 – COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient(s)	% (w/w)	ACGIH	CAS NO.
Sodium Hydroxide	49 – 52	2 mg/m ³ (TLV-C)	1310-73-2

SECTION 3 – HAZARD IDENTIFICATION

Emergency Overview: Odorless, clear, non-volatile liquid. EXTREMELY CORROSIVE! Causes severe burns on contact. Can cause blindness, permanent scarring and death. Aerosols can cause lung injury – effects may be delayed. Highly reactive. Can react violently with water and numerous commonly encountered materials, generating enough heat to ignite nearby combustible materials. Contact with many organic and inorganic chemicals may cause fire or explosion. Reacts with some metals to liberate hydrogen gas, which can form explosive mixtures with air. Will not burn. Harmful to aquatic life. Read the entire MSDS for a more thorough evaluation of the hazards.

Potential Health Effects:

Routes of exposure: Inhalation, skin contact, eye contact and ingestion.

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Inhalation: Sodium hydroxide does not readily form a vapor and inhalation exposure is likely to occur as an aerosol. Due to its corrosive nature, sodium hydroxide aerosols could cause pulmonary edema (severe, life-threatening lung injury). The development of pulmonary edema may be delayed up to 48 hours after exposure. The early symptoms of pulmonary edema include shortness of breath and tightness in the chest.

Skin Contact: EXTREMELY CORROSIVE! Sodium hydroxide is capable of causing severe burns with deep ulceration and permanent scarring. It can penetrate to deeper layers of skin and corrosion will continue until removed. The severity of injury depends on the concentration (solutions) and the duration of exposure. Burns may not be immediately painful; onset of pain may be delayed minutes to hours. Several human studies and case reports describe the corrosive effects of sodium hydroxide. A 4% solution of sodium hydroxide, applied to a volunteer's arm for 15 to 180 minutes, caused damage which progressed from destruction of cells of the hard outer layer of the skin within 15 minutes to total destruction of all layers of the skin in 60 minutes. Solutions as weak as 0.12% have damaged healthy skin within 1 hour.

Eye Contact: EXTREMELY CORROSIVE! The severity of injury increases with the concentration, the duration of exposure, and the speed of penetration into the eye. Damage can range from severe irritation and mild scarring to blistering, disintegration, ulceration, severe scarring and clouding. Conditions, which affect vision such as glaucoma and cataracts, are possible late developments. In severe cases, there is progressive ulceration and clouding of eye tissue which may lead to permanent blindness.

Ingestion: EXTREMELY CORROSIVE! Severe pain; burning of the mouth, throat and esophagus; vomiting; diarrhea; collapse and possible death may result.

Chronic Effects: SKIN: Repeated or prolonged skin contact would be expected to cause drying, cracking, and inflammation of the skin (dermatitis).

Existing Medical Conditions Possibly Aggravated by Exposure: Asthma, bronchitis, emphysema and other lung diseases and chronic nose, sinus or throat conditions. Skin irritation may be aggravated in individuals with existing skin disorders.

Carcinogenicity: Sodium hydroxide is not classified as a carcinogen by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as a carcinogen by OSHA (Occupational Safety and Health Administration), and not listed as a carcinogen by NTP (National Toxicology Program).

Δ **Other important hazards:** Refer to TOXICOLOGICAL INFORMATION (Section 11) for additional information.

SECTION 4 – FIRST AID MEASURES

General: If you feel unwell, IMMEDIATELY seek medical advice (show this document).

Inhalation: Move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. Give artificial respiration ONLY if breathing has stopped. Do not use mouth-to-mouth method if victim ingested or inhaled the substance: induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Give Cardiopulmonary Resuscitation (CPR) only if there is no pulse AND no breathing. Obtain medical attention IMMEDIATELY. Symptoms of pulmonary edema can be delayed up to 48 hours after exposure.

Skin Contact: Immediately flush skin with lukewarm water for at least 20 minutes, and up to 60 minutes if necessary. Under lukewarm water remove contaminated clothing, jewelry, and shoes. If irritation persists, repeat flushing. Obtain medical attention immediately. Discard contaminated clothing and shoes in a manner which limits further exposure.

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Eye Contact: Immediately flush eyes with lukewarm water for at least 20 minutes, and up to 60 minutes if necessary. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

Ingestion: DO NOT INDUCE VOMITING. If victim is alert and not convulsing, rinse mouth and give as much water as possible to dilute material (8 to 10 oz. or 240 to 300 mL). If spontaneous vomiting occurs, have victim lean forward with head down, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.

SECTION 5 – FIRE FIGHTING MEASURES

Flammability	Not applicable. Not combustible (does not burn).
Flash Point (method)	Not applicable.
Flammable Limits (Lower)	Not applicable
Flammable Limits (Upper)	Not applicable
Auto Ignition Temperature	Not applicable
Combustion and Thermal Decomposition Products	Sodium oxide fumes
Rate of Burning	Not applicable
Explosive Power	Not applicable
Sensitivity to Mechanical Impact	Not sensitive ; stable material
Sensitivity to Static Charge	Not applicable

Fire and Explosion Hazards: Sodium hydroxide will not burn or support combustion. The reaction of sodium hydroxide with water and a number of commonly encountered materials (see Section 10) can generate sufficient heat to ignite nearby combustible materials. Sodium hydroxide can react with metals, such as aluminum, tin and zinc, to form flammable hydrogen gas.

Extinguishing Media: Use extinguishing media suitable for the surrounding fire. If water is used, care should be taken, since it can generate heat and cause spattering if applied directly to sodium hydroxide.

Special Information: Evacuate area and fight fire from a safe distance or a protected location. Approach fire from upwind. If possible, isolate materials not involved in the fire and protect personnel. Move containers from fire area if it can be done without risk.

Water can be used with extreme caution to extinguish a fire in an area where sodium hydroxide is stored. The water must not come into contact with the sodium hydroxide. Water can be used in flooding quantities as a spray or fog to keep fire-exposed containers cool and absorb heat. At high temperatures, fuming may occur, giving off a strong, corrosive gas. Do not enter without wearing specialized protective equipment suitable for the situation.

Evacuation: If tank or tank truck involved in a fire, ISOLATE and consider evacuation of one-half (1/2) mile (800 meters) in all directions.

Fire Fighting Protective Equipment: Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. Chemical resistant clothing (e.g. chemical splash suit) and positive pressure self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) may be necessary.

NOTE: Also see "Section 10 - Stability and Reactivity"

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SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spills, Leaks, or Releases:

- Restrict access to area until completion of clean up. Ensure trained personnel conduct clean up. Ventilate area.
- Wear adequate personal protective equipment (See Section 8). Do not touch spilled material.
- Prevent entry into sewers or waterways.
- Land spill of sodium hydroxide: Solutions should be contained by diking with inert material, such as sand or earth. Solutions can be recovered or carefully diluted with water and cautiously neutralized with acids such as acetic acid or hydrochloric acid.
- Water spill: Neutralize with dilute acid.
- Comply with Federal, Provincial/State and local regulations on reporting releases.

Deactivating Chemicals: Weak acid solutions (acetic, hydrochloric or sulfuric acid).

Waste Disposal Methods: Dispose of waste material at an approved waste treatment/disposal facility, in accordance with applicable regulations. Do not dispose of waste with normal garbage or to sewer systems.

Note

- Clean-up material may be a RCRA Hazardous Waste on disposal.
- Spills are subject to CERCLA reporting requirements: RQ = 1000 lbs. (454 kg).

SECTION 7 – HANDLING AND STORAGE

Precautions: EXTREMELY CORROSIVE! Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Wear appropriate Personal Protection Equipment (*Refer to Section 8*). People working with this chemical should be properly trained regarding its hazards and its safe use.

Handling Procedures and Equipment: Use smallest possible amounts in designated areas with adequate ventilation. Keep containers closed when not in use. Empty containers may contain hazardous residues. Avoid generating mists. Transfer solutions using equipment, which is corrosion-resistant. Cautiously, transfer into sturdy containers made of compatible materials. Never return contaminated material to its original container. Considerable heat is generated when diluted with water. Proper handling procedures must be followed to prevent vigorous boiling, splattering or violent eruption of the diluted solution. Never add water to a sodium hydroxide solution. **ALWAYS ADD SODIUM HYDROXIDE TO WATER** and provide agitation. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation.

Storage Requirements: Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use and when empty. Protect from damage. Store away from incompatible materials such as strong acids, nitroaromatic, nitroparaffinic or organohalogen compounds. See Section 10 for Incompatibles. Use corrosion-resistant structural materials and lighting and ventilation systems in the storage area. Containers made of nickel alloys are preferred. Steel containers are acceptable if temperatures are not elevated. Nickel is the preferred metal for handling this product. Plastics or plastic-lined steel, or FRP tanks of Derakane vinyl ester resin may be suitable. Container contents may develop pressure after prolonged storage. Drums may need to be vented. Trained personnel should only perform venting.

Storage Temperature: Avoid freezing. Do not expose sealed containers to temperatures above 40°C (104°F).

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SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

PREVENTIVE MEASURES

Recommendations listed in this section indicate the type of equipment which will provide protection against over exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

Engineering Controls: Local exhaust ventilation should be applied wherever there is an incidence of point source emissions or dispersion of regulated contaminants in the work area. Ventilation control of the contaminant as close to its point of generation is both the most economical and safest method to minimize personnel exposure to airborne contaminants. The most effective measures are the total enclosure of processes and the mechanization of handling procedures to prevent all personal contact.

PERSONAL PROTECTIVE EQUIPMENT

Maintain eye wash fountain and quick-drench facilities in work area. Detailed requirements for personal protective equipment should be established on a site-specific basis.

Eye Protection: Wear full face-shield and chemical safety goggles when there is potential for contact.

Skin Protection: Wear appropriate personal protective clothing to prevent skin contact.

Guidelines for sodium hydroxide solutions, 30-70%:

RECOMMENDED (resistance to breakthrough longer than 8 hours): Butyl rubber; natural rubber, neoprene rubber, nitrile rubber, polyethylene, polyvinyl chloride, Teflon™, Viton™, Saranex™, 4H™, Barricade™, CPF 3™, Responder™, Trelchem HPS™, Tychem 10000™.

NOT RECOMMENDED for use (resistance to breakthrough less than 1 hour): Polyvinyl alcohol.

Respiratory Protection:

Up to 10 mg/m³: Supplied Air Respirator (SAR) operated in a continuous-flow mode, eye protection needed; or full face-piece respirator with high-efficiency particulate filter(s); or powered air-purifying respirator with dust and mist filter(s), eye protection needed; or full face-piece Self-Contained Breathing Apparatus (SCBA); or full face-piece SAR.

Emergency or Planned Entry into Unknown Concentrations or IDLH Conditions: Positive pressure, full face-piece SAR; or positive pressure, full face-piece SAR with an auxiliary positive pressure SAR.

ESCAPE: Full face-piece respirator with high-efficiency particulate filter(s); or escape-type SCBA.

EXPOSURE GUIDELINES

PRODUCT: Sodium hydroxide:

Δ	ACGIH Ceiling Exposure Limit (TLV-C)	2 mg/m ³
	OSHA PEL-TWA	2 mg/m ³
	NIOSH IDLH	10 mg/m ³
	NIOSH REL:	C 2 mg/m ³

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SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Alternate Name(s)	Caustic soda liquid 50%, Soda lye, Lye, Liquid Caustic, Sodium Hydrate
Chemical Name	Sodium hydroxide
Chemical Family	Alkali hydroxide
Molecular Formula	NaOH
Molecular Weight	40.01
Physical State and Appearance	Clear-to-slightly turbid liquid
Odor	Odorless
pH	14.0 (Aqueous solution: 5%)
Vapor Pressure	0.2 kPa (1.5 mm Hg) at 20 °C (68°F) (50% solution)
Vapor Density (Air = 1)	Not applicable
Boiling Point	140 °C (284 °F) (50% solution)
Freezing Point	12 °C (53.6 °F) (50% solution)
Solubility (Water)	Soluble in all proportions
Specific Gravity	1.53 (50% solution) 15.5 °C (60°F)
Evaporation Rate	Not applicable
Viscosity (cp):	78.3 at 20 °C (68°F)
Bulk Density (lbs/cu ft):	95.5
Coefficient of Oil/Water Distribution	Essentially zero

SECTION 10 – STABILITY AND REACTIVITY

Chemical Stability: Stable at room temperature.

Hazardous Decomposition Products: Thermal decomposition: sodium oxide fumes

Conditions to Avoid: Water. Keep away from incompatibles.

Incompatibility with other Substances: Sodium hydroxide reacts vigorously, violently or explosively with many organic and inorganic chemicals, such as strong acids, nitroaromatic, nitroparaffin and organohalogen compounds, glycols and organic peroxides. Reacts violently with water generating significant heat and dangerously spattering corrosive sodium hydroxide. Violently polymerizes acetaldehyde, acrolein or acrylonitrile. Produces flammable and explosive hydrogen gas if it reacts with sodium tetrahydroborate or certain metals such as aluminum, tin, or zinc. Can form spontaneously flammable chemicals upon contact with 1,2- dichloroethylene, trichloroethylene or tetrachloroethane. Can produce carbon monoxide upon contact with solutions of sugars, such as fructose, lactose and maltose.

Corrosivity to Metals: Corrosive to aluminum, tin, zinc, copper, and most alloys in which they are present including brass and bronze. Corrosive to steel at elevated temperatures above 40°C(104°F).

Stability and Reactivity Comments: Slowly attacks glass at room temperature.

Hazardous Polymerization: Will not occur. However, it can induce hazardous polymerization of acetaldehyde, acrolein, and acrylonitrile.

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SECTION 11 – TOXICOLOGICAL INFORMATION

For more toxicological information, refer to Section 3.

TOXICOLOGICAL DATA:

Toxicological Data: Sodium hydroxide

Toxicity data: LDLo - Lowest published lethal dose oral rabbit 500 mg /kg ;
LD₅₀ intraperitoneal mouse 40 mg/kg

Irritation data: Standard Draize Tests: 500 mg/24 hour(s) skin-rabbit severe;
400 µg eyes-rabbit mild; 1 percent eyes-rabbit severe;

Mutagenicity: There is no evidence of mutagenic potential.

Reproductive Effects: No information is available.

Teratogenicity and Fetotoxicity: No information is available.

Synergistic Materials: No information is available.

Skin and Respiratory Sensitization: No information is available.

Irritancy: Strong eye and skin irritant.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicological Information:

LC₁₀₀ Cyprinus Carpio 180 ppm/24 hr @ 25°C (77°F)
TLm mosquito fish 125 ppm/96 hr (fresh water);
TLm Bluegill 99 mg/L/48 hr (tap water)

Persistence and Degradation: Degrades readily by reacting with natural carbon dioxide in the air. Does not bioaccumulate.

SECTION 13 – DISPOSAL CONSIDERATIONS

Review federal, state and local government requirements prior to disposal.

Do not dispose of waste with normal garbage, or to sewer systems.

Whatever cannot be saved for recovery or recycling, including containers, should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options.

RCRA: Test waste material for corrosivity, D002, prior to disposal.

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SECTION 14 – TRANSPORT INFORMATION

	TDG	DOT
Shipping Name	SODIUM HYDROXIDE, SOLUTION	Sodium hydroxide, solution
Hazard Class/Division	8	8
Identification No.	UN1824	UN1824
Packing Group:	II	II
Reportable Quantity	Not Applicable	RQ: 1000 lbs. (454 kg)
ERAP	NONE	Not Applicable

- Δ **IATA/ICAO Shipping Description:** UN1824, Sodium hydroxide solution, Class 8, PG II is accepted for air transport.
- Δ **For Chemical Emergencies in Transportation Requiring Activation of Olin 24 Hour Emergency Response Plan Call:**
- U.S. 1-800-424-9300 – Chemtrec
Canada 1-800-567-7455

SECTION 15 – REGULATORY INFORMATION

Δ **CANADIAN INFORMATION:**

This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

Controlled Products Regulations (WHMIS) Classification:

E: Corrosive Material

CEPA / Canadian Domestic Substances List (DSL): Y

WHMIS Ingredient Disclosure List: Meets criteria for disclosure at 1% or greater.

Δ **USA INFORMATION:**

OSHA Classification: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

SARA Regulations sections 313 and 40 CFR 372: N

SARA Hazard Categories, SARA SECTIONS 311/312 (40 CFR 370.2):

ACUTE: Y

CHRONIC: N

FIRE: N

REACTIVE: Y

SUDDEN RELEASE: N

OSHA PROCESS SAFETY (29 CFR 1910.119): N

CERCLA SECTION 103 (40 CFR 302.4): Y

Reportable Quantity (RQ) under CERCLA: 1000 lbs. (454 kg)

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TSCA Inventory Status: Y

This product does not contain nor is it manufactured with ozone depleting substances.

Δ EUROPEAN ECONOMIC COMMUNITY (EEC) INFORMATION:

EINECS Number: 215-185-5

SECTION 16 – OTHER INFORMATION

- Δ The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Olin will not be liable for any damages, losses, injuries or consequential damages that may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

Revision Indicators:

- Δ In the left margin indicates a revision or addition of information since the previous issue.

**National Fire Protection Association (NFPA) Rating
Hazardous Materials Identification System (HMIS) Rating**

	NFPA	HMIS	
HEALTH	3	3	4 = Extreme/Severe
FIRE	0	0	3 = High/Serious
REACTIVITY / INSTABILITY	1	1	2 = Moderate
SPECIAL HAZARDS	N/Ap	N/Ap	1 = Slight
			0 = Minimum
			W = Water Reactive
			OX = Oxidizer
			* = Chronic health hazard

Δ REFERENCES:

1. Chemlist, STN Database, Chemical Abstract Service, 1999
2. "CHEMINFO", CCOHS, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada, (2008).
3. DOSE, Royal Society of Chemistry, Aug 27, 1999.
4. HSDB- Hazardous Substances Data Bank, CCOHS, 2008.
5. RTECS-Registry of Toxic Effects of Chemical Substances, On-line search, Canadian Centre for Occupational Health and Safety RTECS database, Doris V. Sweet, Ed., National Institute for Occupational Safety and Health, U.S. Dept. of Health and Human Services, Cincinnati, Entry Update/ August 2007.
6. "2008 Threshold Limit Values and Biological Exposure Indices", American Conference of Government Industrial Hygienists, 2008.
7. Merck, 11th Edition, 1989

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Δ **LEGEND:**

ACGIH	- American Conference of Governmental Industrial Hygienists
AFFF	- Aqueous Film Forming Foam
AIHA	- American Industrial Hygiene Association
CAS #	- Chemical Abstracts Service Registry Number
CERCLA	- Comprehensive Environmental Response, Compensation, and Liability Act
CFR	- Code of Federal Regulations
DOT	- Department of Transportation
EINECS	- European Inventory of Existing Chemical Substances
EPA	- Environmental Protection Agency
ERAP	- Emergency Response Assistance Plan
IATA	- International Air Transportation Association
ICAO	- International Civil Aviation Organization
FRP	- Fiberglass Reinforced Plastic
HMIS	- Hazardous Materials Identification System
IARC	- International Agency for Research on Cancer
IDLH	- Immediately Dangerous to Life and Health
LC50	- The concentration of material in air expected to kill 50% of a group of test animals
LD ₅₀	- Lethal Dose expected to kill 50% of a group of test animals
MSHA	- Mine Safety and Health Administration
N/Ap	- Not Applicable
N/Av	- Not Available
NFPA	- National Fire Protection Association
NIOSH	- National Institute for Occupational Safety and Health
NTP	- National Toxicology Program
OSHA	- Occupational Safety & Health Administration
PEL	- Permissible Exposure Limit
PVC	- Polyvinyl chloride
RCRA	- Resource Conservation and Recovery Act
SARA	- Superfund Amendments and Reauthorization Act of the U.S. EPA
STEL	- Short Term Exposure Limit
TDG	- Transportation of Dangerous Goods Act/Regulations
TLV	- Threshold Limit Value
TSCA	- Toxic Substances Control Act
TWA	- Time Weighted Average
WEEL	- Workplace Environmental Exposure Level
WHMIS	- Workplace Hazardous Materials Identification System

Prepared by: Olin
(514) 397-6100



SALES AND SERVICE CORPORATION

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Suffolk Sales and Service Corporation
5705 Lee Farm Road
Suite D
Suffolk, Virginia 23435

REVISION DATE: March 16, 2008

Customer Service:

1-800-628-5185

24-HOUR EMERGENCY TELEPHONE: 1-800-424-9300 (CHEMTREC - U.S.)

SUBSTANCE: CAUSTIC SODA LIQUID (ALL GRADES)

TRADE NAMES:

Caustic Soda Diaphragm Grade 50%
Caustic Soda Membrane Grade 50%

SYNONYMS:

Sodium hydroxide solution; Liquid caustic; Lye solution; Caustic; Lye; Soda lye

PRODUCT USE:

Metal finishing, water treatment, cleaner, process chemical, petroleum industry.

Suffolk Sales Membrane Caustic Soda 50% is certified to ANSI/NSF Standard 60.

2. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=1

HMIS RATINGS (SCALE 0-4): HEALTH=3 FLAMMABILITY=0 REACTIVITY=1

EMERGENCY OVERVIEW:

COLOR: colorless to slightly colored

PHYSICAL FORM: liquid

ODOR: odorless

SIGNAL WORD: DANGER

MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES BURNS TO THE RESPIRATORY TRACT, SKIN, EYES AND GASTROINTESTINAL TRACT. CAUSES PERMANENT EYE DAMAGE.

PHYSICAL HAZARDS: Mixing with water, acid or incompatible materials may cause splattering and release of heat.

ECOLOGICAL HAZARDS: This material has exhibited moderate toxicity to aquatic organisms.

PRECAUTIONARY STATEMENTS: Do not get in eyes, on skin, or on clothing. Do not breathe vapor or mist. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation.

POTENTIAL HEALTH EFFECTS:**INHALATION:**

SHORT TERM EXPOSURE: *mist may cause irritation (possibly severe), burns, and pulmonary edema*

LONG TERM EXPOSURE: *to our knowledge, no effects are known*

SKIN CONTACT:

SHORT TERM EXPOSURE: *irritation (possibly severe) burns*

LONG TERM EXPOSURE: *dermatitis*

EYE CONTACT:

SHORT TERM EXPOSURE: *irritation (possibly severe), burns, eye damage, and blindness*

LONG TERM EXPOSURE: *visual disturbances*

INGESTION:

SHORT TERM EXPOSURE: *irritation (possibly severe), burns, nausea, vomiting*

LONG TERM EXPOSURE: *to our knowledge, no effects are known*

CARCINOGEN STATUS: OSHA: No NTP: No IARC: No

3. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: WATER

CAS NUMBER: 7732-18-5

PERCENTAGE: 48.5-94.5

COMPONENT: SODIUM HYDROXIDE

CAS NUMBER: 1310-73

PERCENTAGE: 5.5-51.5

COMPONENT: SODIUM CHLORIDE

CAS NUMBER: 7647-14-5

PERCENTAGE: 0-5.0

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, qualified personnel should administer oxygen. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and **CALL FOR EMERGENCY SERVICES IMMEDIATELY.**

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing before reuse. Discard contaminated leather goods. **GET MEDICAL ATTENTION IMMEDIATELY.**

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. **GET MEDICAL ATTENTION IMMEDIATELY.**

INGESTION: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. Give large amounts of water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. **GET MEDICAL ATTENTION IMMEDIATELY.**

NOTE TO PHYSICIAN: The absence of visible signs or symptoms of burns does NOT reliably exclude the presence of actual tissue damage. Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: Use extinguishing agents appropriate for surrounding fire.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water. Wear NIOSH approved positive-pressure self-contained breathing apparatus. Avoid contact with skin.

SENSITIVITY TO MECHANICAL IMPACT: Not sensitive

SENSITIVITY TO STATIC DISCHARGE: Not sensitive

FLASH POINT: not flammable

6. ACCIDENTAL RELEASE MEASURES

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OCCUPATIONAL RELEASE:

Wear appropriate personal protective equipment recommended in Section 8 of the MSDS. Completely contain spilled material with dikes, sandbags, etc. Keep out of water supplies and sewers. Reprocess or reuse if possible. Shovel dry material into suitable container. Liquid material may be removed with a vacuum truck. Remaining material may be diluted with water and neutralized with dilute acid. Flush spill area with water, if appropriate. This material is alkaline and may raise the pH of surface waters with low buffering capacity. Releases should be reported, if required, to appropriate agencies. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800) 424-8802 (USA) or (202) 426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Keep container tightly closed and properly labeled. Do not store in aluminum container or use aluminum fittings or transfer lines, as flammable hydrogen gas may be generated. Keep separated from incompatible substances (see Section 10 of the MSDS).

HANDLING: Avoid breathing vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. When mixing, slowly add to water to minimize heat generation and spattering.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:

SODIUM HYDROXIDE:

2 mg/m³ OSHA TWA

2-mg/m³ OSHA ceiling (vacated by 58 FR 35338, June 30, 1993)

2-mg/m³ ACGIH ceiling

VENTILATION: Provide local-exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear safety glasses with side shields. Wear chemical safety goggles with a face shield to protect against skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear chemical resistant clothing and rubber boots when potential for contact with the material exists. Contaminated clothing should be removed, then discarded or laundered. Always place pants legs over boots.

GLOVES: Wear appropriate chemical resistant gloves.

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PROTECTIVE MATERIAL TYPES: butyl rubber, natural rubber, neoprene, nitrile, polyvinyl chloride (PVC), Tychem(R)

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: 10 mg/m³

RESPIRATOR: Where vapor concentration exceeds or is likely to exceed applicable exposure limits, a NIOSH approved respirator is required. If eye irritation occurs, a full face style mask should be used. When an air-purifying respirator is not adequate or when there are vapor concentrations above 10 ppm or for spills and/or emergencies, a NIOSH approved self-contained breathing apparatus or airline respirator, with full-face piece, is required. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid

APPEARANCE: clear to opaque

COLOR: colorless to slightly colored

ODOR: odorless

BOILING POINT: 230-291 F (110-144 C)

FREEZING POINT: -26 to 59 F (-32 to 15 C)

VAPOR PRESSURE: 13-135 mmHg @ 60 C

VAPOR DENSITY: Not available

SPECIFIC GRAVITY (water=1): 1.11-1.53 @ 15.6 C

DENSITY: 9.27-12.76 lbs/gal @ 15.6 C

WATER SOLUBILITY: 100%

PH: 14.0 (7.5% solution)

VOLATILITY: Not available

ODOR THRESHOLD: Not available

EVAPORATION RATE: Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available.

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Mixing with water, acid or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars or food and beverage products in enclosed spaces.

INCOMPATIBILITIES: acids, halogenated compounds, prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys.

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: None known.

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POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

CAUSTIC SODA LIQUID (ALL GRADES):

TOXICITY DATA: Sodium Hydroxide: 1350 mg/kg Dermal-Rabbit LD50. The severity of the tissue damage is a function of its concentration, the length of tissue contact time, and local tissue conditions. After exposure there may be a time delay before irritation and other effects occur. This material is a strong irritant and is corrosive to the skin, eyes, and mucous membranes. This material may cause severe burns and permanent damage to any tissue with which it comes into contact. Inhalation will cause severe irritation; possible burns with pulmonary edema, which may lead to pneumonitis. Skin contact with this material may cause severe irritation and corrosion of tissue. Eye contact can cause severe irritation, corrosion with possible corneal damage and blindness. Ingestion may cause irritation, corrosion/ulceration, nausea, and vomiting. In general, chronic effects are due to long-term irritation. This material may cause dermatitis on the skin, or recurrent corneal ulceration and visual disturbances. In rare cases reports have noted long-term inhalation causes bronchial inflammatory reaction or obstructive airway dysfunction.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory system (including asthma and other breathing disorders).

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: This material has exhibited moderate toxicity to aquatic organisms. For sodium hydroxide: 100 ppm LC50 Daphnia; 25 ppm 24 hours LC50 Brook trout; 48 ppm LC50 King salmon; 33 - 100 ppm 48 hours LC50 Shrimp; 330 - 1000 ppm 48 hours LC50 Cockle

FATE AND TRANSPORT:

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity. This material is believed to exist in the disassociated state in the environment.

BIOCONCENTRATION: This material is believed not to bioaccumulate.

OTHER ECOLOGICAL INFORMATION: This material has exhibited slight toxicity to terrestrial organisms.

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13. DISPOSAL CONSIDERATIONS

Reuse or reprocess if possible. Dispose in accordance with all applicable regulations.
Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste
Number(s): D002.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Sodium hydroxide solution
ID NUMBER: UN1824
HAZARD CLASS OR DIVISION: 8
PACKING GROUP: II
LABELING REQUIREMENTS: 8
DOT HAZARDOUS SUBSTANCE(S):
Sodium hydroxide 1000 lb(s) (454 kg(s))

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Sodium hydroxide solution
UN NUMBER: UN1824
CLASS: 8
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
SODIUM HYDROXIDE: 1000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

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OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

FDA: This material has Generally Recognized as Safe (GRAS) status under specific FDA regulations. Additional information is available from the Code of Federal Register (CFR) which is accessible on the FDA's website.

STATE REGULATIONS:

California Proposition 65: This product is not listed, but it may contain contaminants known to the State of California to cause cancer or reproductive toxicity as listed under Proposition 65 State Drinking Water and Toxic Enforcement Act. For additional information, contact Customer Service.

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW:

REPORTING REQUIREMENT:

WATER 7732-18-5 48.5-94.5%

SODIUM HYDROXIDE 1310-73-2 5.5-51.5%

SODIUM CHLORIDE 7647-14-5 0-5.0%

RIGHT TO KNOW HAZARDOUS SUBSTANCE LIST:

SODIUM HYDROXIDE 1310-73-2 5.5-51.5%

SPECIAL HEALTH HAZARD SUBSTANCE LIST:

SODIUM HYDROXIDE 1310-73-2 5.5-51.5%

PENNSYLVANIA RIGHT TO KNOW:

REPORTING REQUIREMENT:

WATER 7732-18-5 48.5-94.5%

SODIUM HYDROXIDE 1310-73-2 5.5-51.5%

SODIUM CHLORIDE 7647-14-5 0-5.0%

HAZARDOUS SUBSTANCE LIST:

SODIUM HYDROXIDE 1310-73-2 5.5-51.5%

ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST:

SODIUM HYDROXIDE 1310-73-2 5.5-51.5%

SPECIAL HAZARDOUS SUBSTANCE LIST:

Not regulated

CANADIAN REGULATIONS:

CONTROLLED PRODUCTS REGULATIONS (CPR): This product has been classified in accordance with the criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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WHMIS CLASSIFICATION: E.

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA): All the components of this substance are listed on or are exempt from the inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDL): All components of this product are listed on the DSL.

16. OTHER INFORMATION

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SUITABILITY, STABILITY OR OTHERWISE. The information included herein is not intended to be all-inclusive as to the appropriate manner and/or conditions of use, handling and/or storage. Factors pertaining to certain conditions of storage, handling, or use of this product may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended to, and nothing herein shall be construed as a recommendation to, infringe any existing patents or violate any laws, rules, regulations or ordinances of any governmental entity.

MATERIAL SAFETY DATA SHEET

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CHEMTRADE
LOGISTICS

SULFURIC ACID
Revision: 5
Revised Date:
October 25, 2010
Replaces MSDS dated:
October 2008
MSDS No. - 001

FOR CHEMICAL EMERGENCY
24 Hours
IN CANADA Call CANUTEC (613) 996-6666
IN the USA Call CHEMTREC (800) 424-9300
CHEMTREC - OUTSIDE USA (703) 527-3887
Chemtrade Emergency Contact: (866) 416-4404

SECTION 01 - PRODUCT & COMPANY IDENTIFICATION

COMPANY INFORMATION:

Corporate Office
CHEMTRADE LOGISTICS
155 Gordon Baker Road
Suite 300
Toronto, Ontario M2H 3N5
Prepared by: Chemtrade Logistics Inc.
Date Prepared: 10-1-2010
For MSDS Info: (866) 887 - 8805
(416) 496-5856
www.chemtradelogistics.com

Sales/ Customer Service
CHEMTRADE LOGISTICS
7905 boul. Louis-H Lafontaine
Suite 200
Anjou QC H1K 4E4
Main Office: (514) 640-2002

HAZARD RATINGS:

WHMIS:	CONTROLLED	NFPA	RATING	HMIS	RATING
CLASS	D1A - Very Toxic (acute)	HEALTH	3	HEALTH	3*
	D2B - Very Toxic (chronic)		0		0
	E - Corrosive to skin	REACTIVITY	2	PHYSICAL HAZARD	2
		SPECIFIC HAZARD	W	PERSONAL PROTECTION [@]	C

[@] - The personal protective level of C is the minimum level required. See Section 8 for additional recommended personal protective equipment (PPE). User should determine the acceptable PPE for their employees.

PRODUCT INFORMATION:

PRODUCT NAME: Sulfuric Acid
CAS NUMBER: 7664-93-9(See SECTION 2)
FORMULA: H₂SO₄
PRIMARY PRODUCT USE: Used in manufacture of fertilizers, explosives, other acids, metal pickling and petroleum processing.
SYNONYMS: Sulphuric Acid, Hydrogen Sulphate, Oil of Vitriol, Battery Acid
CHEMICAL FAMILY: Inorganic Acid
TRADE NAMES: None

SECTION 02 - COMPOSITION/INFORMATION ON INGREDIENTS

No.	COMPONENT	CAS NO.	WT. %	SOURCE	EXPOSURE LIMITS
* 1.	Sulfuric Acid	7664-93-9	70 - 100%	ACGIH TLV	0.2 mg/m ³ thoracic fraction (A2**) 8-hour TWA
				OSHA (PEL)	1 mg/m ³ 8- hour TWA
				NIOSH (REL)	1 mg/m ³ 10- hour TWA
2.	Water	7732-18-5	0 - 30%		

** - A2 notation refers to sulfuric acid contained in strong inorganic acid mists; suspected human carcinogen (**Refer to Section 3**)

SECTION 03 – HAZARDS IDENTIFICATION
EMERGENCY OVERVIEW:

Danger! Extremely corrosive. Causes severe burns and eye damage. Acid mist causes respiratory irritation. Harmful if inhaled. Harmful or fatal if swallowed. Reacts violently with water. Concentrated Sulfuric Acid will react with many organic materials and may cause fire due to the heat of the reaction. Not flammable, but reacts with most metals to form explosive/flammable hydrogen gas.

Read the entire MSDS for a more thorough evaluation of the hazards.

(REFER TO SECTION 11 FOR ADDITIONAL INFORMATION)

EXPECTED ROUTE OF ENTRY	
SKIN CONTACT:	X
SKIN ABSORPTION:	
EYE CONTACT:	X
INHALATION:	X
INGESTION:	X

EFFECTS OF EXPOSURE:
ACUTE:
SKIN CONTACT:

Corrosive - causes burns, and brownish or yellow stains. Concentrated solutions may cause second or third degree burns with severe destruction of tissue (necrosis). Prolonged and repeated exposure to dilute solutions may cause irritation, redness, pain and drying and cracking of the skin.

EYE CONTACT:

Corrosive – causes immediate pain, severe burns and corneal damage, which may result in permanent blindness.

INHALATION:

Harmful if inhaled. Inhalation causes respiratory irritation and at high concentrations may cause severe injury, burns, or death. Symptoms may include lung irritation, chest pain, wheezing, and shortness of breath. Effects of exposure may be delayed.

INGESTION:

Corrosive – Harmful or fatal if swallowed. Ingestion may causes severe irritation or burns of the mouth, throat, and esophagus.

CHRONIC:

Chronic long term inhalation exposure to sulfuric acid mist may cause cancer.

Repeated exposures to high levels of sulfuric acid mist may cause etching or erosion of teeth.

KNOWN EFFECTS ON OTHER ILLNESSES:

Skin irritation may be aggravated in individuals with existing skin lesions. Breathing of vapors or sprays (mists) may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis.

LISTED CARCINOGEN (REFER TO SECTION 11 FOR ADDITIONAL INFORMATION):

Agency	Listed	Ranking
OSHA:	X	Listed by IARC, NTP and ACGIH
NTP:	X	Known Human Carcinogen
IARC:	X	Group 1 – Proven Human Carcinogen
ACGIH	X	Category A2 – Suspected Human Carcinogen

NOTE: Rankings apply to exposure to sulfuric acid mists **NOT** to sulfuric acid and sulfuric acid solutions.

SECTION 04 – FIRST AID MEASURES

GENERAL:

Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. **SPEED IS ESSENTIAL.**

OBTAIN IMMEDIATE MEDICAL ATTENTION.

FIRST AID FOR EYES:

Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention **IMMEDIATELY**. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

FIRST AID FOR SKIN:

Flush **IMMEDIATELY** under running water for minimum of 20 minutes. If redness or irritation persists, repeat flushing. Seek **IMMEDIATE** medical attention. Start flushing while removing contaminated clothing. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.

While the patient is being transported to a medical facility, apply compresses of iced water. If medical treatment must be delayed, immerse the affected area in iced water. If immersion is not practical, compresses of iced water can be applied. Avoid freezing tissues.

Discard heavily contaminated clothing and shoes in a manner that limits further exposure. Otherwise, wash clothing separately before reuse.

FIRST AID FOR INHALATION:

NOTE: Do not use mouth-to-mouth method if victim ingested or inhaled the substance: induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Remove subject to fresh air. Seek medical aid if lung irritation persists or if breathing becomes difficult. If breathing stops, begin artificial respiration (rescue breathing). If no breathing and no pulse, begin Cardiopulmonary Resuscitation (CPR). Seek **IMMEDIATE** medical attention.

FIRST AID FOR INGESTION:

DO NOT INDUCE VOMITING. If vomiting occurs, have victim lean forward with head down.

If ingested material may cause damage to internal tissues, **IMMEDIATELY** call physician and seek medical attention. Send copy of MSDS to physician.

If victim is alert and not convulsing, rinse mouth with water or saline solution to dilute material. **NEVER** give anything by mouth to an unconscious person. Do not give oral fluids or attempt to neutralize the ingested material.

NOTE TO PHYSICIAN:

This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration.

Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. Following exposure the patient should be kept under medical review for at least 48 hours as delayed pneumonitis may occur.

DO NOT attempt to neutralize the acid with weak bases since the reaction will produce heat that may extend the corrosive injury.

SECTION 05 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA:

WATER:	
ALCOHOL FOAM:	X
CARBON DIOXIDE (CO ₂):	X
DRY CHEMICAL:	X
WATER/FOG SPRAY:	
NO EXTINGUISHING MEDIA:	

FLASH POINT (°F):

Not applicable – product not combustible

FLAMMABLE LIMITS:

Lower Explosive Limit (LEL): Not applicable

Upper Explosive Limit (UEL): Not applicable

AUTOIGNITION TEMPERATURE (°F): Not applicable

HAZARDOUS COMBUSTION PRODUCTS:

When heated to decomposition products of combustion will include toxic fumes of oxides of sulfur (e.g., sulfur dioxide and sulfur trioxide).

SPECIAL FIRE FIGHTING PROCEDURES:

Exercise **CAUTION** when fighting any chemical fire. Evacuate non-essential personnel to a safe area. Prevent unauthorized entry to fire area.

Use NIOSH approved positive pressure self-contained breathing apparatus and full protective clothing. Avoid direct contact with product and exposure to vapors and mists.

For fighting fires in close proximity to spills or vapors, use acid resistant protective equipment.

Dike area to contain runoff and prevent contamination of water sources. Neutralize runoff with lime, soda ash, magnesium hydroxide or other suitable neutralizing agents.

Use water spray to cool containers that are exposed to flames until fire is out. **DO NOT** use water directly on product, material reacts violently with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Product is not flammable but highly reactive. Reacts violently with water with evolution of heat and can react with organic materials explosively. **Refer to Section 10** for additional information.

Reacts with many metals to liberate hydrogen gas which can form explosive mixtures with air. Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. **STAY AWAY** from sealed containers in fire situations. Fight fire from maximum distance possible.

Product is strong dehydrating agent which may cause ignition of finely divided combustible materials on contact.

SECTION 06 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE OF SPILL OR LEAK:

Isolate spill area. Evacuate non-essential personnel to a safe distance. Personnel responding to spill must be properly trained.

Wear proper personal protective equipment. Avoid inhalation of dust and direct contact with eyes and skin and inhalation of mists or vapors.

If safe to do so, stop discharge and contain spill by forming barriers to minimize contaminated area. Prevent liquid from entering sewers or waterways. Diking and absorbent materials must be non-reactive with corrosive materials.

Due to potential for generation of hydrogen gas, ventilate area and remove all ignition sources (no smoking, flares, sparks or flames). All equipment should be bonded and grounded. Use spark-proof tools.

Contain and recover liquid material when possible. Neutralize with alkaline material such as soda ash, lime or magnesium hydroxide, then absorb with inert material such as DRY earth, sand or other non-combustible material. **DO NOT** use combustible materials, such as saw dust. Use clean non-sparking tools to collect material and place it into loosely covered containers compatible with corrosives (e.g., plastic) for later disposal.

Comply with all Federal, state, provincial and local regulations for reporting releases. Spills are subject to CERCLA reporting requirements: RQ = 1000 lbs. National Response Center (800-424-8802).

Cover **small spills** with **DRY** earth, sand or other non-combustible material. Use clean non-sparking tools to collect material and place it into loosely covered containers compatible with corrosives for later disposal.

Dike **large spills** with **DRY** earth, sand or other non-combustible material. Collect material with clean non-sparking scoops or tools and place in containers compatible with corrosives for later disposal. Consider in-situ neutralization and disposal. Ensure liquid material is properly contained. Avoid creating runoff.

Ensure adequate decontamination of tools and equipment following clean up. Decontaminate tools and equipment by using alkaline neutralizing agent and scrubbing with soap and water. Remove any cleaning wastes and contaminated soil with the recovered material.

DO NOT dispose of waste with normal garbage or to sewer systems.

Due to corrosivity and potential reactivity, cleaned up material may be a RCRA Hazardous Waste. Generator is responsible for proper characterization of waste material. Dispose waste material at approved waste treatment/disposal facility in accordance with applicable Federal, state, provincial and local regulations. See **Section 13** for additional information.

SECTION 07 - HANDLING AND STORAGE

HANDLING PROCEDURES:

CORROSIVE material - people working with this chemical should be properly trained regarding its hazards and its safe use. Observe all warnings and precautions for this product.

Wear appropriate acid resistant personal protective equipment to avoid contact with eyes, skin and clothing. Avoid inhalation of mist and vapors. Do not ingest material.

CAUTION: Hydrogen, a highly flammable gas, can accumulate to explosive concentrations inside drums, or any types of steel containers or tanks upon storage. When opening metal containers, use spark-proof tools. Keep ignition sources away from sulfuric acid storage, handling and transportation equipment.

Locate safety shower and eyewash station close to chemical handling area.

Use **EXTREME** care when diluting with water. **Always add acid to water.**

Containers of this material may be hazardous when empty since they may contain product residues.

STORAGE INFORMATION:

Store in cool, dry place with adequate ventilation.

Store in tightly closed containers. Metal and, specifically carbon steel, storage tanks must be vented due to potential for release of hydrogen gas.

Corrosion rates increase with elevated temperatures.

SECTION 08 – EXPOSURE CONTROLS/PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT:

RECOMMENDED: Tight fitting chemical safety goggles with face shield. Impervious (i.e., neoprene, PVC) gloves, coveralls, boots and/or other acid resistant protective clothing. Full-face respirator should be utilized when there is potential exposure to acid mist.



Where there is a danger of spilling or splashing, acid resistant aprons or suits should be worn. Trouser legs should be worn outside (not tucked in) rubber boots.

RESPIRATORY PROTECTION:

- * A NIOSH approved full-face air-purifying respirator equipped with acid gas cartridge and N95 or higher particulate filter for concentrations up to 10 mg/m³. If oil particles are present, use R or P type filters.

For higher or unknown concentrations, as well as fire-fighting and other emergencies, use NIOSH approved positive pressure, self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT:

Eyewash and safety shower required in the work area and storage/handling areas.

ENGINEERING CONTROLS:

Use enclosed processes and local exhaust ventilation to keep airborne contaminants below recommended exposure limits. Apply local ventilation control as close to point of generation as possible.

Where possible, use mechanized or automated handling procedures to prevent or minimize personal contact with sulfuric acid.

Smoking should be prohibited in areas in which sulfuric acid is stored or handled.

Electrical installations should be protected against the corrosive action of acid vapors.

EXPOSURE LIMITS:

Refer to **SECTION 2** for Recommended Exposure Limits.

IDLH (IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONCENTRATION):

15 mg/m³

SECTION 09 – PHYSICAL AND CHEMICAL PROPERTIES

CHEMICAL FORMULA:	H ₂ SO ₄
MOLECULAR WEIGHT	98.08
PHYSICAL STATE:	Liquid
APPEARANCE AND ODOR:	Odourless, clear to amber, heavy, oily liquid. A pungent odor may exist If certain impurities are present in the acid.
ODOR THRESHOLD:	Not applicable
pH:	0.3 (1N solution at 78°F/25°C)
SOLUBILITY IN WATER (% IN WATER):	Miscible in all proportions in water.
SPECIFIC GRAVITY @ 60°F / 15°C:	1.7059 (77.67%); 1.8354 (93.19%); 1.8437 (98%)
BULK DENSITY:	Not applicable (see specific gravity)
BOILING POINT (°F):	380°F / 193°C (77.67%); 529°F / 276°C (93.19%); 626°F / 330°C (98%)
MELTING POINT/FREEZING POINT (°F):	+ 11.6°F / -11.2°C (77.67%); -21.1°F / 29.5°C (93.19%); 30°F / -1.1°C (98%)
VAPOR PRESSURE (MM HG) @ 102°F / 40°C:	1.2 mm Hg (77.67%); 0.0016 mm Hg (93.19%); 0.02 mm Hg (98%)

VAPOR DENSITY: (AIR=1):	3.4 (sulfuric acid component)
EVAPORATION RATE:	Not applicable
PERCENT VOLATILES BY VOLUME:	Not applicable
OCTANOL/WATER PARTITION COEFFICIENT:	Not determined

SECTION 10 – STABILITY AND REACTIVITY

STABILITY: The product is stable under normal conditions.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases and vapors (e.g., sulfur dioxide, sulfuric acid vapors/mists and sulfur trioxide may be released when sulfuric acid decomposes

CONDITIONS TO AVOID:

Reacts violently with water. When diluting, add acid to water. **DO NOT** add water to the acid.

Product is corrosive. Contact with metals may produce flammable hydrogen gas.

Keep away from heat and sources of ignition. Avoid temperatures which may have a negative effect on the materials of construction used in equipment.

Contact with organic materials (such as alcohol, acrylonitrile, chlorates, carbides, epichlorohydrin, fulminates, isoprene, nitrates and picrates) may cause fire and explosions.

* INCOMPATIBILITY

Sulfuric acid is very reactive substance. The concentrated acid oxidizes, dehydrates, or sulfonates most organic compounds. Verify compatibility before use.

Violent or explosive reactions may occur upon contact with but not limited to the following: water, acrylonitrile, alkali solutions, carbides, chlorates, fulminates, nitrates, perchlorates, permanganates, picrates, metals, metal powder, metal acetylides or carbides, aniline, epichlorohydrin, ethylenediamine, alcohols with strong hydrogen peroxide, chlorosulfonic acid, cyclopentadiene, hydrofluoric acid, nitromethane, 4-nitrotoluene, phosphorous (III) oxide, potassium, sodium, ethylene glycol isoprene and styrene.

Contact with chemicals or metals may evolve hazardous gases such as hydrogen, hydrogen cyanide, hydrogen sulfide, and acetylene.

Acetaldehyde and allyl chloride may polymerize violently in presence of sulfuric acid.

SECTION 11 - TOXICOLOGICAL INFORMATION
TOXICITY:

Product is corrosive and known to cause severe tissue destruction on contact with skin or eyes.

May be fatal if ingested.

Cancer Hazard.

REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) NUMBER:
WS5600000

TOXICITY:

	TOXICITY	DESCRIPTION	RESULTS	TESTED ON
	ACUTE ORAL			
	LD₅₀ (ORAL):	Lethal Dose (50%)	2140 mg/kg of body weight	Rat
	ACUTE INHALATION			
	LC₅₀ (INHALATION):	Lethal Concentration (50%)	510 mg/m ³ (2 hours)	Rat
	LC₅₀ (INHALATION):	Lethal Concentration (50%)	320 mg/m ³ (2 hours)	Mouse
*	LC₅₀ (INHALATION):	Lethal Concentration (50%)	18 to 50 mg/m ³ (8 hours)	Guinea Pig

	IRRITATION	
*	SKIN IRRITATION:	Sulfuric acid is corrosive based on pH. Solutions of 10% or less have caused mild irritation.
*	EYE IRRITATION:	Sulfuric acid is corrosive based on pH. Solutions of 10% or less have caused severe irritation.

Carcinogenicity:

The International Agency for Research on Cancer (IARC) has concluded that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to man, causing cancer of the larynx (the voice box). Although no direct link has been established between exposure to sulfuric acid, itself, and cancer in man, exposure to any mist or aerosol during the use of this product should be avoided See **Section 3**. Hazard Information, regarding Potential Health Effects (Long Term Exposure) for further discussion.

Reproductive Effects:

- * Sulfuric acid is not known to cause reproductive toxicity.

Mice and rabbits were exposed by inhalation to 5 and 20 mg/m³ for 7 hrs/day throughout pregnancy. Slight maternal toxicity observed in both species at 20 mg/m³. Slightly embryotoxic in rabbit offspring (a minor, rare skeletal variation).

Mutagenicity Data:

- * Sulfuric acid is not known to be mutagenic.
- * Cytogenic analysis of Chinese hamster ovaries after exposure to solutions of sulfuric acid indicated increases in chromosomal aberrations (chromatid breaks) with (pH 4.5 and 8 mmol/L H₂SO₄) and without (pH 6.2 and 4 mmol/L H₂SO₄) activation.

Teratogenicity Data:

Sulfuric acid is not known to cause developmental toxicity.

Not teratogenic in mice and rabbits.

Synergistic Materials:

None known

- * Conflicting results in animal studies on interactive effects of ozone and sulfuric acid.

SECTION 12 - ECOLOGICAL INFORMATION

ECOTOXICITY:

- * Harmful to aquatic and plant life in very low concentrations. May be dangerous if it enters water intakes. Toxicity depends on the resulting pH (< 5.0), hardness of the water and species exposed.
- * Product is very mobile in soil. Mobility increases with dilution. During transport through soil, sulfuric acid can dissolve some of the soil material such as carbonate based material.

Due to high mobility, product may reach ground water. Sulfuric acid will ultimately react with calcium and magnesium in water to form sulfate salts.

ENVIRONMENTAL TOXICITY:

SPECIES	TEST TYPE	ENDPOINT	DURATION (hours)	DESCRIPTION	RESULT (mg/L)
ACUTE TOXICITY					
<i>BRACHYDANIO RERIO</i> (fresh water fish)	Static	Lethal Concentration (50%)	24	LC ₅₀	82
	Static	Lethal Concentration (50%)	96	LC ₅₀	> 500
<i>GAMBUSA AFFINIS</i> (fresh water fish)	Not specified	Lethal Concentration (50%)	96	LC ₅₀ pH 6.7 – 8.2	42
<i>LEPOMIS MACROCHIRUS</i> (fresh water fish)	Not specified	Lethal Concentration (50%)	96	LC ₅₀ pH 3.25 – 3.5	16-28
<i>PANDALUS MONTAGUI</i> (pink shrimp)	Not specified	Effective Concentration (50%)	96	EC ₅₀	42.5
<i>CRANGON CRANGON</i> (crustacea)	Not specified	Effective Concentration (50%)	48	LC ₅₀	70-80
<i>DAPHNIA MAGNA</i> (crustacea)	Not specified	Effective Concentration (50%)	24	EC ₅₀ inhibition of mobility	29
ACTIVATED SLUDGE	Aquatic	Effective Concentration (50%)	120	EC ₅₀ Respiration inhibition	58

SPECIES	TEST TYPE	ENDPOINT	DURATION (hours)	DESCRIPTION	RESULT (mg/L)
CHRONIC TOXICITY					
<i>CYPRINUS CARPIO</i> <i>CARPIO</i> (fresh water fish)	pH	Effective Concentration (50%)	96	EC ₅₀ Reproduction rate	4.5 – 5.1

NOTE: Results reported above are based on research studies conducted on sulfuric acid. Actual products have not been tested.

BIOACCUMULATION POTENTIAL:	Negative - Bioaccumulation does not occur.
BIOLOGICAL OXYGEN DEMAND (BOD5):	Sulfuric acid does not cause a biological oxygen demand.
CHEMICAL OXYGEN DEMAND:	Not determined
BIOLOGICAL OXYGEN DEMAND (BOD5):	Sulfuric acid does not cause a biological oxygen demand.
BIOLOGICAL ELIMINATION:	Not determined

SECTION 13 – DISPOSAL CONSIDERATIONS

WASTE DISPOSAL INFORMATION:

Cleaned up material may be a hazardous waste as defined by Resource Conservation and Recovery Act (RCRA) on disposal due to the corrosivity characteristic. **DO NOT** flush to surface water or sanitary sewer system. Waste must be disposed of in accordance with federal, state, provincial and local environmental control regulations.

DO NOT flush to surface water or sanitary sewer system.

Containers of this material may be hazardous when empty since they may contain product residues.

Generator of the waste material is responsible for the proper characterization and disposal of the material. Dispose of material in accordance with ALL applicable Federal, state, provincial and local regulations at approved waste management site.

SECTION 14 - TRANSPORT INFORMATION

U.S. DOT REGULATED:	REGULATED
SHIPPING NAME:	Sulfuric Acid
UN/NA NUMBER:	UN1830
HAZARD CLASS:	8
PACKAGING GROUP:	II
SPECIAL PROVISIONS (refer to 49 CFR 172.102):	A3,A7,B3,B83, B84, IB2, N34, T8, TP2, TP12
EXCEPTIONS:	49 CFR 173.154
NON-BULK:	49 CFR 173.202
BULK:	49 CFR 173.242
PASSENGER AIRCRAFT/RAIL:	1 L (CARGO AIRCRAFT – 30L)
VESSEL STOWAGE:	CATEGORY C - on deck only (refer to 49 CFR 172.101(k))
ER GUIDE:	137

CANADIAN TRANSPORT REGULATION:	REGULATED
SHIPPING NAME:	SULFURIC ACID
UN/NA NUMBER:	UN1830
HAZARD CLASS:	8
PACKAGING GROUP:	II
SPECIAL PROVISIONS:	None
LIMITED QUANTITY:	1 L
ERAP:	3000 L
PASSENGER CARRYING SHIP/RAIL:	1 L (Rail)

INTERNATIONAL AIR TRANSPORTATION REGULATIONS:	REGULATED
SHIPPING NAME:	Sulfuric Acid
UN/NA NUMBER:	UN1830
HAZARD CLASS:	8
PACKAGING GROUP:	II

INTERNATIONAL MARITIME DANGEROUS GOODS REGULATION:	REGULATED
SHIPPING NAME:	Sulfuric Acid
UN/NA NUMBER:	UN1830
HAZARD CLASS:	8
PACKAGING GROUP:	II

SECTION 15 - REGULATORY INFORMATION

OSHA:

Meets criteria for hazardous material as defined by the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910.1200.

TSCA:

All components of this product are registered under the regulations of the Toxic Substances Control Act (TSCA).

SARA (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT):

SARA (SECTION 311/312):			SARA (SECTION 302):		RQ
REACTIVE HAZARD:	Y		EXTREMELY HAZARDOUS SUBSTANCE:	Y	1000 lb / 454 kg
PRESSURE HAZARD:	N		CERCLA HAZARDOUS SUBSTANCE:	Y	1000 lb / 454 kg
FIRE HAZARD:	N				
IMMEDIATE/ACUTE:	Y		SARA (SECTION 304):		
DELAYED/CHRONIC:	Y		RELEASE NOTIFICATION	Y	1000 lb / 454 kg

SARA (SECTION 313 - TOXIC CHEMICAL): Sulfuric acid is listed for aerosol forms only.

CERCLA – COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT: (FOR COMPONENTS LISTED IN SECTION 2)
SULFURIC ACID RQ = 1000 lbs

RCRA (RESOURCE CONSERVATION & RECOVERY ACT): Product may become Hazardous Waste. Generator is responsible for proper characterization and disposal of waste.

RCRA #: D001 – Corrosive; D003 - Reactivity

CLEAN WATER ACT – PRIORITY POLLUTANTS: This product contains no known priority pollutants at concentrations greater than 0.1%

CLEAN AIR ACT:
VOLATILE ORGANIC COMPOUNDS (VOC) (EPA METHOD 24/24a): None expected

SECTION 112(r) – Risk Management Plan Sulfuric acid is not listed

FDA: This product is **NOT** registered with the Food and Drug Administration (FDA).

USDA: This product is **NOT** registered with the U.S. Department of Agriculture (USDA).

CANADIAN REGULATORY INFORMATION:
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): This product conforms to the CEPA regulations.

LISTED ON DOMESTIC SUBSTANCE LIST (DSL): Listed

LISTED AS PRIORITY SUBSTANCE: Components are **NOT** listed.

LISTED AS TOXIC SUBSTANCE: Components are **NOT** listed.

EXPORT CONTROL LIST: Components are **NOT** listed.

LISTED ON NON-DOMESTIC SUBSTANCES LIST (NDSL): Components are **NOT** listed.

NATIONAL POLLUTANT RELEASE INVENTORY (NPRI): Product is subject to NPRI reporting

HEALTH CANADA'S CONTROLLED DRUG AND SUBSTANCES ACT Sulfuric acid is a Class B Drug Precursor

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all the information required by the *Controlled Products Regulations*.

WORKPLACE HAZARDOUS INFORMATION SYSTEM (WHMIS):

WHMIS STATUS: Controlled

CLASS: Class D1A - Very Toxic
 Class D2B – Potentially carcinogenic. Acid mists containing sulfuric acid indicated as carcinogenic.
 Class E – Corrosive

WHMIS Health Effects Index: D1A - Acute Lethality - very toxic – immediate
 D2B – Chronic toxicity – very toxic – other
 E - Corrosive to animal skin

WHMIS Ingredient Disclosure List: Meets criteria for disclosure at 1% or greater.

EUROPEAN/INTERNATIONAL REGULATIONS:

EUROPEAN INVENTORY OF EXISTING COMMERCIAL SUBSTANCES (EINECS) NUMBER: 231-639-5

EUROPEAN PRIORITY LISTS: Chemical components are not listed in a priority list (as foreseen under Council Regulation (EEC) No 793/93 on the evaluation and control of the risks of existing substances) and are not listed in annex I of council regulation no. (EC) 689/2008.

HAZARD SYMBOLS: C – Corrosive

RISK PHRASES: **R35** – Causes severe burns

SAFETY PHRASES: **S26** – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S30-Never add water to this product
S36 – Wear suitable protective clothing.
S45 – In case of accident or if you feel unwell, seek medical advice immediately.

SECTION 16 – OTHER INFORMATION

OTHER PRECAUTIONS: None Known

STATE REGULATORY INFORMATION:

MASSACHUSETTS SUBSTANCES LIST: Listed (Extraordinarily Hazardous)

NEW JERSEY RIGHT TO KNOW (RTK) SUBSTANCE NUMBER: 1761

NEW YORK LIST OF HAZARDOUS SUBSTANCES: Listed
 (RQ_{air} = 1000 lbs, RQ_{land/water} = 100 lbs.)

PENNSYLVANIA HAZARDOUS SUBSTANCE LIST: Listed (Environmental Hazard)

RHODE ISLAND HAZARDOUS SUBSTANCE LIST: Listed (T - ACGIH, F – NFPA)

LABEL INFORMATION:**LABEL HAZARDS:**

DANGER! Corrosive - causes severe burns and eye damage.

DANGER! Harmful or fatal if swallowed.

WARNING! Harmful if inhaled. Cancer Hazard. Avoid inhalation of mists.

WARNING! Reacts violently with water. **Always add acid to water.**

LABEL PRECAUTIONS: Wear appropriate personal protective equipment to avoid contact with eyes and skin.

Reacts with most metals to form flammable hydrogen gas. Use with adequate ventilation.
Use caution when opening closed containers.

MAIN REFERENCES:

1. CHEMPENDIUM Database, Canadian Centre for Occupational Health and Safety (CCOHS), Hamilton, Ontario, Canada, October 2010, <http://ccinfoweb2.ccohs.ca>.
2. IUCLID Datasheet for sulphuric acid, European Chemicals Bureau, October 13, 2000, <http://ecb.jrc.ec.europa.eu/esis>.
3. NIOSH POCKET GUIDE TO CHEMICAL HAZARDS (NIOSH 2005-149), U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, September 2005, <http://www.cdc.gov/niosh/npg/npgd0577.html>.
4. "2010 Threshold Limit Values and Biological Exposure Indices", American Conference of Government Industrial Hygienists, 2010.
5. Screening Information Data Sets (SIDS) – sulfuric acid, Initial Assessment Report for 11th SIAM, Organization for Economic Co-operation and Development, UNEP Publications, January 2001, <http://www.chem.unep.ch/irptc/sids/oecd/sids/7664939.pdf>.
6. Supplier's Material Safety Data Sheets.

* - Indicates sections that were revised from previous versions of this document.

ACRONYMS:

ACGIH – American Conference of Governmental Industrial Hygienists
 CAS – Chemical Abstract Service
 CERCLA – Comprehensive Environmental Response, Compensation and Liability Act
 DOT – Department of Transportation (U.S.)
 EC – Effective Concentration (where desired endpoint observed)
 EEC – European Economic Community
 EPA – Environmental Protection Agency
 g/m³ – grams per cubic meter
 HMIS - Hazardous Materials Identification System
 IARC - International Agency for Research on Cancer
 LC – Lethal Concentration
 LD – Lethal Dose
 mg/m³ – milligrams per cubic meter
 mg/kg – milligrams per kilogram
 mg/L – milligrams per liter
 NIOSH – National Institute for Occupational Safety and Health
 MSDS – Material Safety Data Sheet
 NOAEL – No Observed Adverse Effect Level
 NOEC – No Observed Effect Concentration
 NTP – National Toxicology Program
 OSHA – Occupational Safety and Health Administration
 RCRA – Resource Conservation and Recovery Act
 RQ – Reportable Quantity
 SARA – Superfund Amendments and Reauthorization Act
 TWA – Time weighted average (8-hour)
 UN/NA – United Nations/North America
 WHMIS – Workplace Hazardous Materials Information System (Canada)
 WT. % - Weight Percent

IN ACCORDANCE WITH GOOD PRACTICES OF PERSONAL CLEANLINESS AND HYGIENE, HANDLE WITH DUE CARE AND AVOID UNNECESSARY CONTACT WITH THIS PRODUCT. THIS INFORMATION IS BEING SUPPLIED TO YOU UNDER U.S. OSHA'S "RIGHT TO KNOW" (29 CFR 1910.1200) AND CANADA'S WHMIS REGULATIONS. THE INFORMATION IS OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS A PRODUCT SPECIFICATION. THE INFORMATION CONTAINED HEREIN IS BASED ON DATA AVAILABLE TO US AND IS BELIEVED TO BE TRUE AND ACCURATE. NO WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THIS DATA, THE HAZARDS CONNECTED WITH THE USE OF THE MATERIAL, OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, IS MADE. CHEMTRADE LOGISTICS ASSUMES NO RESPONSIBILITY. CHEMTRADE ADHERES TO THE CODES OF RESPONSIBLE CARE.

SOUTHERN IONICS INCORPORATED
MATERIAL SAFETY DATA SHEET

MSDS. NO. 024
Effective Date: September 9, 2002
Revision Date: January 19, 2007

PRODUCT NAME: SODIUM BISULFITE AQUEOUS SOLUTION

Transportation Emergencies, Call (800) 424-9300 (CHEMTREC)
Health Emergencies, contact Your Local Poison Center
Caution: Causes irritation. Avoid contact with skin, eyes or clothing.

I. PRODUCT INFORMATION

Product Name: Sodium Bisulfite Aqueous Solution **Formula:** See Below
Chemical Name: Sodium Bisulfite Aqueous Solution
CAS Number: 7631-90-5

Typical Composition	CAS #'s	%
Sodium Bisulfite (NaHSO ₃)	7631-90-5	38-44
Sodium Sulfite (Na ₂ SO ₃)	7757-83-7	<1
Sodium Sulfate (Na ₂ SO ₄)	7757-82-6	<4
Water	7732-18-5	60-65

Exposure Standard: ACGIH TWA – 5 mg/m³ for solid sodium bisulfite.

Hazard Ratings: Health = 3 Flammability = 0 Reactivity = 1
0 = Least; 1 = Slight; 2 = Moderate; 3 = High; 4 = Extreme;

II. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

Ventilation: Use local exhaust ventilation with a minimum capture velocity of 100 ft/min. (0.5 m/sec.) at the point of vapor evacuation. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Eye: Use chemical splash goggles and face shield (ANSI Z67.1 or approved equivalent). Eye protection worn must be compatible with respiratory protection system employed.

Skin: Chemically resistant gloves should be worn whenever this material is handled. Glove permeation data does not exist for this material. The following glove(s) should be used for splash protection only: - Neoprene Gloves should be removed and replaced immediately if there is any indication of degradation or chemical breakthrough. Rinse and remove gloves immediately after use. Wash hands with soap and water.

Respiratory: A respiratory protection program meeting OSHA 1910.134 ANSI Z88.2 requirements must be followed whenever work place conditions warrant a respirator's use.

For exposure exceeding TWA and up to 10 times the TWA, wear a MSHA/NIOSH approved (or equivalent) full-facepiece, air-purifying respirator.

For exposure in excess of 10 times the TWA and up to 100 times the TWA or Unknown, wear a MSHA/NIOSH approved (or equivalent) self-contained breathing apparatus in the positive pressure mode, or, MSHA/NIOSH approved (or equivalent) full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Air-purifying respirators should be equipped with acid gas cartridges.

Other: Where splashing is possible, full chemically resistant protective clothing (e.g. acid suit) and boots are required.

III. HEALTH INFORMATION

PHYSIOLOGICAL & HEALTH EFFECTS

Routes of Entry:

Eyes: Direct contact with material can cause the following: severe irritation

Repeated contact at high concentrations can cause the following: corneal burning

Skin: Prolonged or repeated skin contact or when confined to skin can cause the following: irritation - dermatitis

Inhalation: Inhalation of vapor or mist can cause the following: irritation of nose, throat, and lungs – coughing – shortness of breath

Ingestion: Material is harmful if swallowed.

Material can cause the following: gastrointestinal irritation – allergic reaction

Material in large doses can cause the following: abdominal pain – control nervous system depression – diarrhea – depression - death

Toxicity: LD50 in rats 2000 mg/kg orally

EMERGENCY & FIRST AID PROCEDURES

Eyes: IMMEDIATELY flush eyes with a large amount of water for at least 15 minutes. Get prompt medical attention.

Skin: Remove contaminated clothing. Wash skin thoroughly with soap and water. Get prompt medical attention. Wash contaminated clothing thoroughly before reuse.

Inhalation: Move subject to fresh air. If breathing is difficult, give oxygen. Give artificial respiration if breathing has stopped. Call a physician.

Ingestion: Induce vomiting by giving 2 glasses of water to drink and touching back of subject's throat with finger. IMMEDIATELY see a physician. Never give anything by mouth to an unconscious person.

IV. REACTIVITY DATA

Stability: This material is considered stable.

Conditions To Avoid: Avoid exposure to excessive heat.

Incompatibility: Avoid contact with the following: acids – oxidizing agents

Hazardous Decomposition

Products: Thermal decomposition may yield the following: sulfur dioxide – toxic fumes

Hazardous

Polymerization: Product will not undergo hazardous polymerization.

V. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and

Odor: Clear yellow liquid, pungent odor

Boiling Point: 103°C/217°F Estimated

Melting Point: No Data

**Vapor Density
(air = 1):** > 1.0 Estimate

Vapor Pressure: 32 mm Hg Estimate

Solubility in water: Dilutable

**Specific Gravity
(H₂O =1):** 1.31 to 1.38

pH: 3.5 to 5.0

**Other (i.e. wt.
per gallon):** 10.8 to 11.3 lb/gal

VI. SPECIAL PRECAUTIONS**Handling and Storage**

Precautions: Avoid temperature extremes during storage; ambient temperature preferred. Do not store this material near food, animal feed or drinking water. Store in well ventilated area. Store away from excessive heat (e.g. steam pipes, radiators), and from reactive materials. Keep container tightly closed when not in use.

The vapor above sodium bisulfite solution contains water vapor and sulfur dioxide. The concentration of sulfur dioxide varies with conditions, temperature and the pH of the SBS being the most important. Caution is recommended in determining how and where such vapors are handled and vented. The ACGIH TWA for sulfur dioxide is 2 ppm.

Do not handle material near food, animal feed or drinking water. This material is corrosive. See the PERSONAL PROTECTION MEASURES Section prior to handling. Vapors can be evolved when material is

heated during processing operations. See FACILITY CONTROL MEASURES Section for types of ventilation required. Slight positive pressure may develop upon long-term storage in air-tight containers. Carefully relieve any pressure build-up when opening container. Wash after handling and shower at end of work period.

CONTAINERS HAZARDOUS WHEN EMPTY. Since emptied containers retain product residue (vapors and/or liquid) follow all MSDS and label warnings even after container is emptied. Empty drums should be rinsed with water before discarding. Dispose empty container in a sanitary landfill or by incineration as allowed by state and local authorities. Avoid inhalation of smoke if incinerated.

VII. FIRE PROTECTION INFORMATION

Flash Point: Not applicable **Flammable Limits:** Not flammable

Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

**Special Firefighting
Procedures:**

Move containers promptly out of fire zone. If removal is impossible, cool containers with water spray. Remain upwind. Avoid breathing noxious fumes (sulfur dioxide) from fire-exposed material.

VIII. TRANSPORTATION REQUIREMENTS

DOT Proper Shipping Name: Bisulfites, inorganic, aqueous solutions, n.o.s. (Sodium Bisulfite)

DOT Classification: 8

UN/NA Identification Number: UN2693

Packing Group: III

Other Labels: Corrosive

IX. SPILL AND LEAK PROCEDURES**Precaution if**

Spilled or Released: Contain spills immediately with inert materials (i.e. sand, earth). Evacuate and ventilate spill area. Avoid all contact. Transfer liquids and solid diking material to separate suitable containers for recovery or disposal. CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

Neutralizing Chemicals:

Sodium Bisulfite may be neutralized with sodium hydroxide, or soda ash to neutral pH. Avoid acidic conditions (i.e. pH <5.0), since under acidic conditions, sulfur dioxide a poisonous gas can be released.

Waste Disposal

Methods: For disposal, incinerate or landfill at a permitted facility in accordance with local, state, and federal regulations (see 40 CFR Part 268).

Reportable

Quantities: 5,000 lbs on dry weight basis for sodium bisulfite.

X. NSF CERTIFICATION

Sodium Bisulfite manufactured at Pasadena, TX and Tuscaloosa, AL are NSF-60 Certified. Maximum use in potable water is 50 mg/l.

SALES OFFICE

For Product Information:
TEL: 662-494-3055
FAX: 662-494-2828

Post Office Drawer 1217
West Point, MS 39773

To Place An Order:
TEL: 800-953-3585
FAX: 800-953-3588

IMPORTANT

The information on this Material Safety Data Sheet is believed to be accurate but is not warranted to be so. Protective equipment, health effects, and other related safety measures are based on intended and anticipated product use. Recipients are advised to confirm in advance of need that the information is applicable and suitable to their circumstances.



Stone Container Corporation

Containerboard and Paper Division

Hopewell Mill

910 Industrial Road
P.O. Box 201
Hopewell, Virginia 23860

MATERIAL SAFETY DATA SHEET

804 541-9600

Note: Assistance from Westvaco Chemical Division was provided and is very much appreciated.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: ~~CTC~~
Chemical Name: Crude tall oil
Chemical Family: Tall oil
Formula: Mixture of long chain and tricyclic organic acids plus ester of sterols and fatty acids
CAS Registry Number: 8002-26-4

Manufacturer: Stone Container Corporation
910 Industrial Street
Hopewell, Virginia 23860

STCC
2861235

Telephone Numbers:

Transportation Emergencies:

CHEMTREC (U.S.A.): (800) 424-9300 (24 hours)

CHEMTREC (International): (202) 483-7616 (24 hours, call collect)

Product Information: (804) 541-9693 (EST, 8:00 a.m.-4:30 p.m., M-F)

2. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Components</u>	<u>CAS #</u>	<u>% by Wt.</u>	<u>Hazardous</u>
Crude tall oil	8002-26-4	100 %	Yes*

*Tall oil itself is not hazardous, but the vapor space above stored tall oil could be due to excessive TRS gas concentrations. See Sections 3 and 8.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Dark brown liquid at room temperature with bland odor. Total reduced sulfur gases including hydrogen sulfide, and methyl mercaptan may be present in vapor space above CTO in amounts exceeding OSHA permissible limits. Avoid mixing with strong oxidizing agents or alkali. Oils in contact with porous materials, including rags, trash, vessel and piping insulation, when stored in confined space may spontaneously combust.

CTO

Potential Health Effects:

Routes of Entry:

Medical Conditions Aggravated by Exposure:

Eyes:

Skin:

Ingestion:

Inhalation:

Target Organ Effect(s):

Chronic Effects (Cancer Information):

- . Ingestion, Inhalation, Absorption
- . Unknown, rosin content may cause an allergic skin reaction to sensitized individuals.
- . Not established, may cause eye irritation. If heated product contacts eye, treat immediately for thermal burn and seek medical attention.
- . Not established, may cause mild skin irritation after prolonged contact. Persons sensitized by contact with rosin may develop an allergic reaction. Dermal LD50 not established.
- . DO NOT INGEST. Ingestion of small amounts is not likely to cause harmful effects. Aspiration of swallowed liquid may cause pneumonitis (damage to lungs).
- . Not established. Exposure to fumes is not expected to cause acute toxicity. Aspiration of liquid product may cause lung damage.
- . Eye and skin irritant.
- . NTP: Not listed
- . IARC: Not listed
- . OSHA: Not listed

4. FIRST AID MEASURES

- | | |
|-------|---|
| Eyes: | Flush eyes with low-pressure water for at least 15 minutes. Remove contact lenses to ensure adequate rinsing of eye. Seek medical attention if irritation persists. |
| Skin: | Wash with soap and running water. |

For thermal burns see PCA First Aid procedure for molten rosin listed below.

Suggested PCA* Procedure for Treatment of Burns From Hot Rosin

The most satisfactory method for the treatment of burns caused by hot rosin appears to be as follows:

1. Cool the affected area as soon as possible in cold water. Be sure to leave the rosin which does not wash off in place.
2. Smother the rosin and surrounded areas with "Silvadene") dressing. "Silvadene" is readily available on the market.
3. Cover the affected area with a protective bandage. As the burn heals, the rosin will loosen from the flesh and flake off.
4. In the case of severe burns where additional medical treatment is required, take a copy of this bulletin to the attending doctor.
5. After two or three days, and the healing process has started, an A and D ointment is substituted for the "Silvadene" to help moisturize the skin.

It is important that the rosin not be removed from the burned area as removal of the rosin from the burned area will damage the flesh and permit infection to occur. Infection is a constant danger with all burns and must be diligently guarded against.

PLEASE NOTE: The procedure detailed above is a suggested procedure only. The actual care and treatment of any individual should be entrusted to a qualified physician (M.D.). Any person using this procedure assumes all risks, known or unknown, arising from its use. The Pulp Chemicals Association assumes no liability for any and all risks or claims that may arise by using this procedure.

Ingestion:

- . DO NOT Induce Vomiting. Aspiration of swallowed liquid product may cause lung damage. Seek medical attention immediately.

Inhalation:

- . If exposed to excessive levels of dust or hot vapors, remove to fresh air and get medical attention if cough or other symptoms develop.

*Pulp Chemicals Association, P. O. Box 105113, Atlanta, GA 30348-5113

5. FIRE FIGHTING MEASURES

Flammable Properties:

Hazardous Combustion Products:

- . Material will burn in a fire, releasing combustion products which may be toxic, including carbon dioxide, carbon monoxide, and smoke.

General Hazards:

- . Can form explosive mixtures at temperatures at or above the flashpoint 143°C (COC) / 290°F. If product is misted minimum flash point may be reduced.

Extinguishing Media:

- . Use alcohol foam, carbon dioxide, water fog, dry chemical, or halon when fighting fires involving this material.

Fire Fighting Instructions:

- . Use self-contained breathing apparatus (pressure-demand, MSHA/NIOSH approved or equivalent) and full protective gear. Cool containers with water if exposed to fire.

Other Information:

Flashpoint:	. 143°C (COC) (290°F) Method: Cleveland Open Cup
Autoignition Temperature:	. Not established
Flammability Limits in Air (% by volume):	. LEL - Not established . UEL - Not established

6. ACCIDENTAL RELEASE (SPILL MEASURES)

Spills:

- . Shut off leak if safe to do so. Dike area, recover and reclaim material if possible. This material should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water.
- . Absorb the liquid on material such as sand, vermiculite, or other inert, noncombustible absorbent and place in clean, dry containers suitable for disposal. Containers should be closed and segregated for later disposal.
- . Scrub the area with detergent and water.

7. HANDLING AND STORAGE

Handling:

- . Minimize skin and eye exposure. Wear gloves and safety glasses.
- . Use with adequate ventilation.
- . Avoid breathing dust or hot vapors.
- . Wash thoroughly after handling.

Storage:

- . Oils in contact with porous materials, including rags, trash, vessel and piping insulation, when stored in confined space may spontaneously combust.
- . Do not use pressure or apply heat with open flame to remove material from drums.
- . Positive displacement or Centrifugal pump is recommended for bulk transfer of hot rosin. Stainless or carbon steel vessel is recommended for storage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:	Good general ventilation should be sufficient control airborne levels. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
Eye Protection:	Wear safety glasses with side shields (or goggles).
Skin Protection:	When material is heated, wear gloves to protect against thermal burns.
Respiratory Protection:	Organic vapor canister or dust respirator if vapors are present. Supplied air is required if hydrogen sulfide or other Total Reduced Sulfur gases are present.
Other Protective Equipment:	Unknown
Exposure Guidelines:	The ACGIH threshold limit value, for particulates not otherwise classified (PNOC), is 10 mg/m ³ for an 8-hour TWA

9. PHYSICAL AND CHEMICAL PROPERTIES (TYPICAL)

Boiling Point:	132° C (270°F)	Viscosity, Viscosity, curve available:	55 cps 66°C (150°F)
Freeze Point:	Not established	Solubility in Water:	Negligible
		Specific Gravity:	1.006 @ 77°C (25°F)
Vapor Pressure:	Nil @ 25°C (77°F) (mm Hg)	Volatiles:	0 %
Vapor Density:	Heavier than air (Air = 1)	Physical State:	Liquid @ 25°C (77°F)
Evaporation Rate:	<1 (Ether = 1)	Appearance:	Dark Brown Liquid
pH:	Not Applicable	Odor:	Bland, Smokey

10. STABILITY AND REACTIVITY

Chemical Stability:	.	This material is stable and hazardous polymerization will not occur.
Conditions to Avoid:	.	Strong oxidizing and alkali agents. Very high temperatures and open flame.
Hazardous Decomposition Products:	.	None
Hazardous Polymerization:	.	None

11. TOXICOLOGICAL INFORMATION

Eyes:	Not established, may cause irritation.
Skin:	Not established, may cause irritation.
Inhalation:	Not established
Ingestion:	Not established
Subchronic Effects;	Not established
Teratology (Birth Defects):	Not established
Mutagenicity (Genetic Effects):	Not established

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

LC ₅₀ (fathead minnows):	8.1 mg/L 96 hours
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Chemical Fate Information:

BOD ₅ =	Not established
BOD ₁₂ =	Not established
TOC =	Not established
COD =	Not established

13. DISPOSAL CONSIDERATIONS

Material should be recovered for reuse if possible. Incineration in permitted facilities of combustible components is the preferred disposal method. All applicable local, state, and federal laws should be consulted prior to disposal. Landfilling in a permitted facility is an alternative.

14. TRANSPORT INFORMATION

DOT Description:

Proper Shipping Name:	Not Regulated by DOT as a hazardous material
Common Shipping Name:	Crude Tall Oil

Hazard Class:	.	Not regulated by DOT
UN/NA Number:	.	Not regulated

15. REGULATORY INFORMATION

U. S. Federal Regulations:		
OSHA (29 CFR 1910.1200):	.	Hazardous by OSHA definition, 29 CFR 1910.1200 due to possible TRS gas in vapor space
CERCLA (40 CFR 302.4):	.	Not regulated
RCRA (40 CFR 261.33)	.	Listed Hazardous Waste: No
(40 CFR 261 Subpart C):	.	Exhibits Characteristic Hazardous Waste? No
SARA Section 312 (40 CFR 355):		
Hazard Category:	.	Physical Hazards: None Known
	.	Health Hazards: Immediate (acute)
SARA Section 313		
(40 CFR 372.65):	.	Product contains no toxic chemical(s)
Toxic Substance Control Act	.	Product is listed on the TSCA inventory.
California Proposition 65:	.	Chemical and risk assessment analyses were performed on this or an analogous product. Results indicate that there are no significant risks (or observable effects), as defined by this statute, associated with this product under conditions of normal use.
International Regulations:		
Canada (DSL):	.	8002-26-4
Europe (EINECS):	.	2323046
Japan (MITI):	.	8-338
Australia (AICS):	.	8002-26-4

16. OTHER INFORMATION

Hazard Rating:

HMIS:

Health - 1
Flammable - 1
Reactivity - 0
Protective Equipment - To be set
by user

NFPA:

Health - 1
Flammable - 1
Reactivity - 0

This product contains rosin. See Section 3 for potential health effects.

ABBREVIATIONS

- | | | |
|-----|------------------|--|
| 1. | ACGIH | American Conference of Governmental Industrial Hygienists |
| 2. | BOD _x | Biochemical Oxygen Demand (After x Days) |
| 3. | CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) |
| 4. | CFR | Code of Federal Regulations |
| 5. | COD | Chemical Oxygen Demand |
| 6. | cps | Centipoise |
| 7. | DOT | Department of Transportation |
| 8. | EPA | Environmental Protection Agency |
| 9. | HMIS | Hazardous Material Information System |
| 10. | IARC | International Agency for Research on Cancer |
| 11. | LC ₅₀ | A single calculated concentration in air or water expected to kill 50% of a group of test animals. |
| 12. | LD ₅₀ | A single calculated dose of a material expected to kill 50% of a group of test animals. |
| 13. | LEL | Lower Explosive Limit of vapor or gas |
| 14. | MSHA | Mine Safety and Health Administration |
| 15. | NIOSH | National Institute for Occupational Safety and Health |
| 16. | NTP | National Toxicology Programs |
| 17. | OSHA | Occupational Safety and Health Administration |
| 18. | PEL | Permissible Exposure Limit established by OSHA |
| 19. | SARA | Superfund Amendments and Reauthorization Act |

- | | | |
|-----|------|---|
| 20. | TLV | Threshold Limit Value |
| 21. | TSCA | Toxic Substances Control Act |
| 22. | TOC | Total Organic Carbon |
| 23. | UEL | Upper Explosive Limit of a vapor or gas |



Material Safety Data Sheet

Issue Date: 3/18/2008

Revision Date: 3/1/2009

Section 1 – Chemical Product and Company Information

Product Name: Vacuum Gas Oil, VGO
Chemical Family: Petroleum Hydrocarbon, Refinery Stream
Manufacturer's Name: Noble Oil Services, Inc.
5617 Clyde Rhyne Drive
Sanford, North Carolina 27330

Product Technical Information Phone Number: 800-662-5364
CHEMTREC (USA): 800-424-9300

Section 2 – Composition Information

Components	% by weight
Blends of distillate and residual petroleum fractions to prescribed viscosity ranges	100

Section 3 – Hazards Identification w/ Emergency Overview

CAUTION!

May cause dizziness and drowsiness
Aspiration hazard if swallowed – can enter lungs and cause damage
Oil Mist may cause respiratory irritation
Contains middle distillates and polynuclear aromatic hydrocarbons which may cause cancer based on animal data

Fire and Explosion Hazards:	Not Applicable
Primary Route(s) of Exposure:	Eyes, Skin, and Inhalation
Inhalation (Breathing):	Vapors or mist, in excess of permissible concentrations, or in unusually high concentrations generated from spraying, heating the material or as from exposure in poorly ventilated areas or confined spaces, may cause irritation of the nose and throat, headache, nausea, and drowsiness. Additional symptoms may include dizziness, euphoria, loss of coordination, and disorientation.

Skin Contact:	This material may cause severe skin irritation. Prolonged or repeated contact may cause defatting of skin or irritation, seen as local redness with possible mild discomfort. Prolonged, widespread, or repeated skin contact may result in the absorption of potentially harmful amounts of materials. Brief contact is not irritating.
Eye Contact:	This material may cause eye irritation. Direct contact may cause burning, tearing, and redness.
Ingestion (Swallowing):	Ingestion of this material (more than several mouthfuls) may cause abdominal discomfort, nausea, and diarrhea. Aspiration may occur during swallowing or vomiting resulting in lung damage.
Comments:	Because of its defatting properties, prolonged and repeated skin contact may aggravate an existing dermatitis (skin condition).

Section 4 – First Aid Measures

Eye Contact:	For direct contact, flush the affected eye(s) with clean water. If irritation or redness develops, seek medical attention.
Skin Contact:	Do not use gasoline, thinners or solvents to remove product from skin, wipe material from skin and remove contaminated clothing, cleanse affected area(s) thoroughly by washing with soap and water and, if necessary, a waterless skin cleaner. If irritation or redness develops and persists, seek medical attention.
Inhalation (Breathing):	If irritation of nose or throat develops, move away from source of exposure and into fresh air. If irritation persists, seek medical attention. If victim is not breathing or if breathing difficulties develop, artificial respirations of oxygen should be administered by qualified personnel and seek immediate medical attention.
Ingestion (Swallowing):	If victim is conscious and alert, give 2 glasses of water to drink but do not induce vomiting. If vomiting occurs, give fluids again. Seek medical attention. Do not give anything by mouth to an unconscious or convulsing person.
Medical Conditions Aggravated:	Pre-existing skin disorders
Other Instructions:	Remove and dry-clean clothing soaked or soiled with this material before re-use. Studies indicate that the dry cleaning of contaminated work clothing may be more effective than normal laundering. Inform individuals responsible for cleaning of potential hazards associated with handling contaminated clothing.

Note to Physician:

Aspiration of this product during induced emesis may result in severe lung injury. If evacuation of stomach is necessary, use method least likely to cause aspiration, such as gastric lavage after endotracheal intubation. Contact a Poison Center for additional treatment information.

Section 5 – Fire Fighting Measures

Flash Point/ Method:	> 350 deg F (COC)
Autoignition Temperature:	Not Determined
Upper/ Lower Flammable Limits:	Not Applicable
Extinguishing Media:	Extinguish with dry chemical, CO ₂ , water spray, foam, sand, or earth. Water and foam may cause frothing.
Fire and Explosion Hazards:	Not Applicable
Fire Fighting Procedures:	Water spray may be useful in minimizing vapors and cooling containers exposed to heat and flame. Avoid spreading burning liquid with water used for cooling purposes.
Special Protective Equipment for Firefighters	Wear full protective clothing and positive pressure breathing apparatus
NFPA Ratings:	Health 1
	Flammability 0
	Reactivity 0
	Other NA

Section 6 – Accidental Release Measures

Remove all sources of ignition around area of release. Ventilate the release area. Respond with trained personnel. Avoid breathing vapors and wear appropriate personal protective equipment including appropriate respiratory protection. Use caution when cleaning up the spill and treat it as a petroleum spill. Contain the release and recover any free liquid. Do not allow the material to enter sewers and waterways. Do not dump into any sewers, on the ground, or into any body of water.

Section 7 – Handling and Storage

Handling: Minimum feasible handling temperatures should be maintained. Material can be at elevated temperatures and/ or pressures. Avoid prolonged and repeated skin contact. Use proper protective equipment when handling this material. Wash skin thoroughly if exposure occurs. Avoid the generation of oil mists while handling. Do not wear oil soaked clothing or shoes.

Storage: Do not transfer to unmarked containers. Keep away from incompatible materials.

Section 8 – Exposure Control/ Personal Protection

Respiratory Protection: Airborne concentrations should be kept to lowest levels possible. The use of respiratory protection is advised when vapor or gas concentrations exceed the established exposure limits. Depending on the airborne concentration, use a respirator with appropriate cartridges and/ or canisters (NIOSH approved) or supplied air equipment. Supplied air equipment should always be used when airborne concentration of the contaminant or oxygen content is unknown.

Protective Gloves: The use of gloves resistant to chemicals and petroleum distillates is advised to prevent skin contact and possible irritation.

Eye Protection: Safety glasses, chemical type goggles, or face shield recommended to prevent eye contact.

Other Protective Equipment: Protective clothing should be worn. Launder or dry-clean when soiled. Exposed skin should be washed several times daily with soap and water.

Ventilation: Local exhaust ventilation recommended if generating vapor, dust, or mist. If current ventilation practices are not adequate in maintaining airborne concentrations below the established exposure limits, additional ventilation or respiratory systems may be required.

Exposure Limits: None established for this product. Recommend Petroleum Hydrocarbons (Oil Mist).

Components	TWA	STEL
Petroleum Hydrocarbons* (OSHA)	5 mg/m ³	10 mg/m ³

* Treated as Oil Mist

Section 9 – Physical and Chemical Properties

Appearance and Odor:	Dark Pale Liquid with Oil-Type Odor
Vapor Pressure:	Not Determined
Vapor Density (Air=1):	Not Determined
Specific Gravity (Water=1):	0.86 – 0.88
Viscosity:	25 – 30 CST (104 deg F/ 40 deg C)
pH of Undiluted Product:	Not Determined
Boiling Point:	> 550 deg. F
Melting Point:	NA

Vacuum Gas Oil MSDS

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Solubility in Water:	Not Determined
VOC Content:	Not Determined
Other:	None

Section 10 – Stability and Reactivity

Incompatibility (Materials to Avoid):	Avoid contact with strong oxidizing agents
Hazardous Polymerization:	Will not occur
Hazardous Decomposition Products:	Thermal decomposition in the presence of air may yield toxic amounts of carbon monoxide, carbon dioxide, irritating aldehydes and ketones.
Conditions To Avoid:	Avoid heat, open flames, oxidizing materials, and mist formation

Section 11 – Toxicological Information

ANIMAL TOXICITY DATA

Median Lethal Dose

Oral:	LD50 > 5.00 g/kg (rat) – Practically Non-Toxic
Inhalation:	Not Determined
Dermal:	LD50 > 2.00 g/kg (rabbit) – Practically Non-Toxic

Irritation Index, Estimation of Irritation (Species)

Skin (Draize):	> 0.5 – 3.0 /8.0 (rabbit) – Slightly Irritating
Eyes (Draize):	< 15.0 /110 (rabbit) – No Appreciable Effect
Sensitization (Buehler):	Negative – Skin (guinea pig)

Other: Complex mixtures of aromatic hydrocarbons which include polynuclear aromatic hydrocarbons (PNAs) have caused cancer in laboratory animals after repeated exposure by inhalation, ingestion, or skin contact.

This product, or a component of this product, belongs to a class of materials, which has been shown to cause cancer when repeatedly applied to the skin of laboratory animals without any effort to remove the material between applications.

This product, or a component of this product, has exhibited evidence for mutagenic activity in standard in-vitro (test tube) tests.

Middle distillates have caused skin irritation and skin cancer in laboratory animals when repeatedly applied and

left in place between applications. Studies to further evaluate the carcinogenic potential of middle distillates are currently underway. Kidney damage has also been observed in laboratory animals exposed to middle distillates.

Section 12 – Ecological Information

Contains petroleum oils and can have a negative impact to the environment if released into the environment.

Section 13 – Disposal Considerations

This product has been evaluated for RCRA characteristics and does not meet the criteria of a hazardous waste if discarded in its purchased form. Under RCRA, it is the responsibility of the user of the product to determine at time of disposal, whether the product meets RCRA criteria for hazardous waste. This is because product uses, transformations, mixtures, processes, etc. may render the resulting materials hazardous.

Section 14 – Transport Information

DOT Proper Shipping Name: Non Regulated Vacuum Gas Oil

Section 15 – Regulatory Information

SARA 311 Hazard Categorization:	None
Regulated Chemicals:	None
WHMIS:	Not Determined
Toxic Substance Control Act (TSCA):	Not Applicable
Clean Water Act (CWA):	This product is classified as oil under Section 311 of the CWA. Spills entering surface waters or any water courses or sewers entering/ leading to surface waters that cause a sheen must be reported to the National Response Center at 800-424-8802.
SARA Title III:	This product does not contain toxic substances subject to the reporting requirements of Section 313 of the Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Section 16 – Other Information

Disclaimer of Expressed and Implied Warranties

The information in this document is believed to be correct as of the date issued. However, no warranty of merchantability, fitness for any particular purpose, or any other warranty is expressed or is to be implied regarding the accuracy or completeness of this information, the results to be obtained from the use of this information or the product, the safety of this product, or the hazards related to its use.

This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assumes the risk of his use thereof.



Asphalt Cement, All Grades

Material Safety Data Sheet

CITGO Asphalt Refining Company
204 Grove Avenue
Thorofare, NJ 08086-2557

MSDS No. ASPLT
Revision Date 3/16/2006

IMPORTANT: Prepared in accordance with 29 CFR 1910.1200. Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Emergency Overview

Physical State Liquid.

Color Brown to black. **Odor** Characteristic, sour, tar-like odor.

WARNING:

Hot product can cause burns to skin. If burned by hot product, cool affected area immediately with cool water. Do not attempt to remove solidified material from skin. Seek medical attention immediately.

Hot asphalt can release toxic Hydrogen Sulfide gas (**H₂S**)! Hydrogen Sulfide can accumulate in vapor space of tanks and vessels during transfer and storage of this material.

Water contact can cause a violent eruption of hot asphalt. Fumes from hot product can cause irritation to the eyes, skin, and respiratory system.

Hazard Rankings

	HMIS	NFPA
Health Hazard	* 2	1
Fire Hazard	1	1
Reactivity	0	0

* = Chronic Health Hazard

Protective Equipment

Minimum Recommended
See Section 8 for Details

This recommendation reflects minimum PPE when product is at elevated temperatures.



SECTION 1. PRODUCT IDENTIFICATION

Trade Name	Asphalt Cement, All Grades	Technical Contact	(856) 224-7409
Product Number	Various	Medical Emergency	(832) 486-4700
CAS Number	Mixture.	CHEMTREC Emergency	(800) 424-9300
		(United States Only)	
Product Family	Asphalt Products.		
Synonyms	Performance Graded Asphalt (unmodified) PG 52-28 (15252), PG 52-34 (15253), PG 58-22 (15254), PG 58-28 (15259), PG 64-22 (15264), PG 64-28 (15266), PG 67-22 (15268), and PG 70-22 (15270). Penetration Graded Asphalt (unmodified) 40/50, 60/70 (15044), 85/100 (15871), 135/145 (15045), 180/200 (15025), and 200 (15026). Asphalt Cement AC 5 (15050), AC 10 (15100), AC 20 (15407), AC 30 (15300) and AC 40 (15301). EB-58 (15858). L-619 Roofers Flux (15805), Industrial Asphalt, Bitumen, Asphalt Flux (15040), Bituminous Oil (15031), Recycling Agent RA 500 (15033), RA 1000 (15260), RA 1500 (15261).		

SECTION 2. COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
Asphalt	8052-42-4	88 - 100
Proprietary Process Oils	Mixture.	0 - 10
Proprietary amine complex antistrip additive	Mixture.	0 - 1

Asphalt Cement, All Grades

SECTION 3. HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact. Inhalation.

Signs and Symptoms of Acute Exposure

Inhalation No significant adverse health effects are expected to occur upon short-term exposure to this product at ambient temperatures. Breathing heated mist or vapor can irritate the mucous membranes of the nose, throat, bronchi, and lungs. Hydrogen sulfide (H₂S) can evolve when this product is stored or handled at elevated temperatures. H₂S can cause respiratory irritation and hypoxia. At low concentrations, H₂S has an odor of rotten eggs. At higher concentrations, H₂S odor is not apparent. At concentrations above 500 ppm, H₂S causes unconsciousness and death by respiratory paralysis. The National Institute for Occupational Safety and Health has determined that atmospheres containing 100 ppm or more of H₂S are immediately dangerous to life and health.

Eye Contact Hot material can cause burns to the eye.
This material can cause eye irritation with tearing, redness, or a stinging or burning feeling. Effects may become more serious with repeated or prolonged contact.

Skin Contact Hot material can cause burns to the skin.
May cause skin irritation with redness, an itching or burning feeling, and swelling of the skin. Effects may become more serious with repeated or prolonged contact.
Skin contact may cause harmful effects in other parts of the body.

Ingestion Contact with hot material may cause thermal burns. If swallowed at ambient temperatures, no significant adverse health effects are anticipated. If swallowed in large quantities, this material can obstruct the intestine.

Chronic Health Effects Summary This material, or a component of this material, has been shown to cause cancer in laboratory animals. The relevance of this to humans is not clear.
See Toxicological Information (Section 11)

Conditions Aggravated by Exposure Disorders of the following organs or organ systems that may be aggravated by significant exposure to this material or its components include: Skin, Respiratory System, Kidneys, Central Nervous System (CNS)

Target Organs Contains material which may cause damage to the following organs: kidneys, liver, upper respiratory tract, skin, eye, lens or cornea

Carcinogenic Potential Certain preparations of this material are classified as carcinogenic by OSHA, NTP, or IARC. See Section 11 of this MSDS for additional information concerning the carcinogenic potential of this product.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	<input checked="" type="checkbox"/>	Sensitizer	<input type="checkbox"/>	Combustible	<input type="checkbox"/>	Explosive	<input type="checkbox"/>	Pyrophoric	<input type="checkbox"/>
Toxic	<input type="checkbox"/>	Highly Toxic	<input type="checkbox"/>	Flammable	<input type="checkbox"/>	Oxidizer	<input type="checkbox"/>	Water-reactive	<input type="checkbox"/>
Corrosive	<input type="checkbox"/>	Carcinogenic	<input type="checkbox"/>	Compressed Gas	<input type="checkbox"/>	Organic Peroxide	<input type="checkbox"/>	Unstable	<input type="checkbox"/>

Asphalt Cement, All Grades

SECTION 4. FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation	Move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. Keep the affected individual warm and at rest.
Eye Contact	Check for and remove contact lenses. Flush eyes with cool, clean, low-pressure water while occasionally lifting and lowering eyelids. Seek medical attention if excessive tearing, redness, or pain persists.
Skin Contact	If burned by hot material, cool skin by quenching with large amounts of cool water. For contact with product at ambient temperatures, remove contaminated shoes and clothing. Wipe off excess material. Wash exposed skin with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Thoroughly clean contaminated clothing before reuse. Discard contaminated leather goods. If material is injected under the skin, seek medical attention immediately.
Ingestion	Do not induce vomiting unless directed to by a physician. Do not give anything to drink unless directed to by a physician. Never give anything by mouth to a person who is not fully conscious. If significant amounts are swallowed or irritation or discomfort occurs, seek medical attention immediately.
Notes to Physician	<p>SKIN: Hot material may cause skin burns. Immerse skin covered with hot material in cool water to limit tissue damage and prevent spread of liquid product. Consider leaving cooled material on skin unless contraindicated by contamination or potential for tattooing. If removal is necessary, mineral oil may be of assistance in minimizing skin loss when removing cool, hardened asphalt.</p> <p>EYES: Hot material may cause burns to the eyes. Early ophthalmologic evaluation is recommended.</p> <p>INGESTION: Check for possible bowel obstruction with ingestion of large quantities of material.</p>

SECTION 5. FIRE FIGHTING MEASURES

NFPA Flammability Classification	NFPA Class-IIIB combustible material.		
Flash Point	Open cup: >232°C (>450°F).		
Lower Flammable Limit	No data.	Upper Flammable Limit	No data.
Autoignition Temperature	Not available.		
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons and oxides of sulfur and/or nitrogen. Hydrogen sulfide and other sulfur-containing gases can evolve from this product particularly at elevated temperatures.		
Special Properties	Fight the fire from a safe distance in a protected location. Cool surface with water fog. Molten material can form flaming droplets if ignited. Water or foam can cause frothing. Use of water on product above 100° C (212° F) can cause product to expand with explosive force. Do not allow liquid runoff to enter sewers or public waters.		
Extinguishing Media	Use dry chemical, foam, Carbon Dioxide or water fog.		

Asphalt Cement, All Grades

Protection of Fire Fighters

Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Remove all potential ignition sources. Administer appropriate first aid as needed. Verify that responders are properly HAZWOPER-trained and wearing appropriate protective equipment during cleanup operations. Isolate the area of the spill and restrict access. For small spills, remove released material with shovels and place into containers for disposal. For large spills, evacuate area immediately. Evaluate potential exposure to response personnel. Respiratory protection may be required. Use protective clothing. Dike far ahead of a liquid spill to ensure complete collection. Do not allow free liquids to enter drains, sewers, ground water, drainage ditches or surface waters. This material is heavier than water. Releases to surface waters will sink. Report releases in accordance with local, state and federal requirements. Some releases must be reported to the National Response Center (800/424-8802).

SECTION 7. HANDLING AND STORAGE

Handling

Use normal precautions when handling hot, molten liquid solutions. Do not breathe fumes or vapor from heated material. Do not allow hot material to contact skin. Wash thoroughly after handling.

Storage

Materials represented by this MSDS are classified as NFPA Class III B combustible liquid. Generally, storage temperatures of 350 °F or below are recommended in cone roof storage tanks to minimize the formation of pyrophoric sulfides and carbonaceous deposits on the tank roof and appurtenant structures. Consult API Recommended Practice 2023 for additional guidance. Store distant from fire and ignition sources. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling or disposing of empty containers or waste residues of this product.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

Engineering controls are normally required when handling hot materials. Use process enclosures, local exhaust ventilation, or other controls to maintain airborne levels below recommended exposure limits (see below). Engineering controls should meet applicable requirements of the National Electrical Code (NEC) Standards. Ensure that an emergency eye wash station and safety shower are located near the work-station.

Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.

This recommendation reflects minimum PPE when product is at elevated temperatures.



Eye Protection

Asphalt Cement, All Grades

Use a full-face shield and chemical safety goggles if handling heated material. With product at ambient temperatures, safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Keep a suitable eye wash station immediately available to the work area.

Hand Protection

When handling product at elevated temperatures, use long-cuffed leather or heat-resistant gloves. When product is at ambient temperatures, use gloves constructed of chemical resistant materials such as heavy nitrile rubber if frequent or prolonged contact is expected.

Body Protection

Prevent skin contact when handling heated material. Use insulated, heat-resistant clothing such as a chemical resistant apron or slicker suit. Use a full-body heat-resistant or internally cooled suit when work conditions dictate.

Respiratory Protection

Contaminant air concentrations determine the level of respiratory protection required. Use only NIOSH-approved respiratory equipment within the limits of the protection factors for that equipment. Use supplied air respirators when H₂S concentrations are expected to exceed applicable workplace exposure levels. Do not use air purifying respiratory equipment when considering elevated H₂S concentrations. Respiratory equipment must be selected on the basis of the maximum expected air concentration.

General Comments

Use good personal hygiene practices. Wash hands and other exposed skin areas with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities, or leaving work. DO NOT use gasoline, kerosene, solvents, or harsh abrasive skin cleaners.

Occupational Exposure Guidelines

Substance

Asphalt

Applicable Workplace Exposure Levels

ACGIH TLV (United States).

TWA: 0.5 mg/m³ 8 hour(s).

ACGIH TLV (United States).

TWA: 10 ppm 8 hour(s).

STEL: 15 ppm 15 minute(s).

OSHA (United States).

CEIL: 20 ppm 8 hour(s).

STEL: 50 ppm 15 minute(s). Form: *10 minute peak; once per 8 hour shift

Hydrogen Sulfide

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES (TYPICAL)

Physical State	Liquid.	Color	Brown to black.	Odor	Characteristic, sour, tar-like odor.
Specific Gravity	>1 (Water = 1)	pH	Not Applicable.	Vapor Density	>1 (Air = 1)
Boiling Range	IBP: AP 400° C (AP 752° F))			Melting/Freezing Point	Not available.
Vapor Pressure	Not available.			Volatility	Negligible volatility.
Solubility in Water	Insoluble in cold water.			Viscosity (cSt @ 40°C)	not available
Flash Point	Open cup: >232°C (>450°F).				
Additional Properties	No additional information.				

Asphalt Cement, All Grades

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability	Stable.	Hazardous Polymerization	Not expected to occur.
Conditions to Avoid	Keep away from extreme heat, strong acids and strong oxidizing conditions.		
Materials Incompatibility	Strong oxidizers.		
Hazardous Decomposition Products	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.		

SECTION 11. TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data

Proprietary Process Oils

Long-term repeated (lifetime) skin exposure to similar materials has been reported to result in an increase in skin tumors in laboratory rodents. The International Agency for Research on Cancer (IARC) has concluded that this category of untreated and mildly-treated oils are possibly carcinogenic to humans (Group 2B).

Asphalt, unoxidized

Acute effects:

Asphalt fumes have been associated with irritation of eyes nose and throat. Also, lower respiratory effects have been reported.

Carcinogenicity:

Animal Studies:

Certain extracts of asphalt (bitumen) have been shown to produce cancers in mouse skin painting studies. In 1985, the International Agency for Research on Cancer (IARC) concluded that there was insufficient evidence to conclude that asphalts alone are carcinogenic to humans. However, IARC did determine that there is sufficient evidence for the carcinogenicity of extracts of steam refined bitumens, air refined bitumens and pooled mixtures of steam and air refined bitumens in experimental animals.

Skin painting studies have demonstrated that certain high temperature asphalt fume condensates can produce cancers in mice. The causal agent is thought to be 4 to 6 ring polycyclic aromatic compounds. These compounds can be found in asphalt fumes generated at temperatures exceeding normal storage and application temperatures of paving asphalt. Studies on fumes similar to those found in the asphalt paving work environment indicated no mutagenic activity.

Epidemiological Studies:

Epidemiological studies have indicated a link between exposure to asphalt fumes and certain types of cancer, including cancers of the lung and G.I. tract in a cohort of Danish workers. However, these studies apparently either did not evaluate or inadequately controlled for confounders such as smoking and concomitant coal tar exposure.

In a cohort of European paving and mastic asphalt workers, an IARC sponsored study suggested a slight increase in lung cancer mortality when asphalt workers were compared to the general national population. The IARC study further suggested that there is a marginal relationship in increased lung cancers and increased average asphalt fume exposure. However, the IARC study could not exclude confounding from exposure to other agents in the workplace. Further, the study did not conclude that increased lung cancer mortality is linked to increased duration of exposure or to cumulative exposure to asphalt fumes. Consequently, the results of this IARC study are considered equivocal.

Asphalt Cement, All Grades

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity	Analysis for ecological effects has not been conducted on this product. Spills into water ways may be harmful to benthic organisms and bottom feeders.
Environmental Fate	This product is estimated to have a slow rate of biodegradation. This product is not expected to bioaccumulate through food chains in the environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Maximize material recovery for reuse or recycling. Conditions of use may cause this material to become a "hazardous waste", as defined by federal or state regulations. It is the responsibility of the user to determine if the material is a "hazardous waste" at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14. TRANSPORT INFORMATION

The shipping description below may not represent requirements for all modes of transportation, shipping methods or locations outside of the United States.

US DOT Status This material is regulated by the US DOT only when it is offered for shipment at temperatures above 212° F (100° C). This material is deemed as non-hazardous when shipped at ambient temperatures and does not require DOT labeling.

Proper Shipping Name Elevated Temperature Liquid, n.o.s.

Hazard Class	9	Packing Group(s)	III
		UN/NA Number	UN 3257

Reportable Quantity A Reportable Quantity (RQ) has not been established for this material.

Placard(s)



Emergency Response Guide No. 128

MARPOL III Status Not a DOT "Marine Pollutant" per 49 CFR 171.8.

SECTION 15. REGULATORY INFORMATION

TSCA Inventory This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.

SARA 302/304 Emergency Planning and Notification The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.

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SARA 311/312 Hazard Identification	The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard
SARA 313 Toxic Chemical Notification and Release Reporting	This product contains the following components in concentrations above <i>de minimis</i> levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA: No components were identified.
CERCLA	The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. This product or refinery stream is not known to contain chemical substances subject to this statute. However, it is recommended that you contact state and local authorities to determine if there are any other reporting requirements in the event of a spill.
Clean Water Act (CWA)	This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.
California Proposition 65	This material may contain the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm, and may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): Polynuclear Aromatic Hydrocarbons
New Jersey Right-to-Know Label	For New Jersey R-T-K labeling requirements, refer to components listed in Section 2.
Additional Remarks	No additional regulatory remarks.

SECTION 16. OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number 1.00
Revision Date 3/16/2006
Print Date Printed on 3/16/2006.

ABBREVIATIONS

AP: Approximately	EQ: Equal	>: Greater Than	<: Less Than	NA: Not Applicable	ND: No Data	NE: Not Established
ACGIH: American Conference of Governmental Industrial Hygienists				AIHA: American Industrial Hygiene Association		
IARC: International Agency for Research on Cancer				NTP: National Toxicology Program		
NIOSH: National Institute of Occupational Safety and Health				OSHA: Occupational Safety and Health Administration		
NPCA: National Paint and Coating Manufacturers Association				HMIS: Hazardous Materials Information System		
NFPA: National Fire Protection Association				EPA: US Environmental Protection Agency		

DISCLAIMER OF LIABILITY

Asphalt Cement, All Grades

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